



amateur radio

Vol. 39, No. 1
JANUARY, 1971

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amateur radio

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COVER STORY

Arrows point to the insulators at the top and bottom of the 14 MHz. quarter wave vertical aerial on the starboard leg of La Balsa's mast. See story on page 4.



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FEDERAL COMMENT

It was my original intention to devote this Federal Comment to a review of the year just past. I would have preferred to have paid tribute to all those who made the 60th year of the Institute such a special year, particularly all those who supported the Cook Bi-Centenary Award so magnificently, and who turned it into one of the high points in the history of Amateur Radio in Australia.

Unfortunately I cannot do this. At a time when I know that so many of you are on a holiday, I must turn, not to the past, but to the present and to the future. In this holiday season, as I convey to you all the Season's Greetings of the Federal Council and the Federal Executive, I have also to tell you of the serious crisis that we face, and seek your support for the solution we propose.

That we faced a very real crisis in our Federal Administration and with this magazine has been apparent for some time. Both have, since their inception, relied on the labour of honorary officers. But as the years have passed, so our organisation has grown. What was once basically a social group with a common interest has grown into an organisation that is fundamental to our very existence.

The amount of work done by officers such as the Federal Secretary, the members of the Federal Executive generally and those responsible for this magazine has grown to the extent that it is no longer possible to maintain the present level of activity by reliance on volunteers alone. How many of us realise the hours of work each week, each day, that the Editor of "A.R." or the Federal Secretary is called upon to do? I joined the Federal Executive after the Easter 1968 Federal Convention. Before that, as Victorian Federal Councillor, at each Convention, I had been able to sit back and offer the Federal Executive the benefit of my advice as to how they should undertake the many tasks they faced. Now I realise only too well how much work must be done.

Certainly we express our gratitude to those doing the work. But to those people neither gratitude nor the satisfaction of doing something worthwhile is enough. The job itself is too big. They want to be able to earn their

living without having to steal time for the Institute. They want to be able to spend a reasonable time with their families. They even want to enjoy their hobby. In a word, they want "out".

The use of volunteers has slowly drifted into the exploitation of volunteers. These are hard words indeed, but I can assure you, they are justified.

What are the choices open to us?

There are only two. To be effective, and I do believe that at present the Institute is effective, and that the magazine is effective, we cannot do less than we are doing now. Indeed, we are not doing all we should; I am particularly unhappy that we are not giving the Federal Councillors, or the members, nearly as much information as we should. No, we cannot cut back and remain effective.

Can we use even more volunteers? Already, in the metropolitan area of Melbourne there is one job going for each 5½ full members. Quite apart from the fact that we have reached a level of saturation, administration cannot be channelled through an indefinite number of people. In the end, the co-ordination of that kind of administration takes just as much effort as the job itself.

Our choice is simple. We can either have a paid, high level permanent administration, both for the Federal body and the magazine, or we can go back to a vastly lower level of activity and effectiveness, where things *might* be done when someone has the time, with the magazine perhaps duplicated and produced five or six times a year.

The Councils of the New South Wales Division and the Victorian Division have, together with Federal Executive, exhaustively examined the problem. They realise that we cannot go back, and the only solution is the first one.

This means that each member will have to pay more in subscriptions each year. Despite this, both the Victorian and New South Wales Divisions have pledged to a programme involving the employment of a Secretary/Manager. Events have moved quickly. Executive has been able to inform some Divisions, but not all, as fully as we would have wished.

To our surprise, we have found nothing but support. Our members seem to have been more aware of the problem than perhaps we thought. In this issue we advertise for a person to fill this post. Remember, when you read this advertisement, that how our organisation grows will depend very much on the man we get. Accordingly, we are looking for a man with top ability and experience, mainly administrative.

The cost to each member rather depends on the financial structure of the member's Division. Some Divisions will be able to effect some economies by the utilisation of the proposed centralisation of certain records, feasible with a permanent administration. Generally speaking, the direct increase to members in the smaller Divisions (which have lower fees than the larger Divisions) will be greater. It will not be more than \$3 per annum.

I earnestly seek your support. Each member can do two things. First, give your Division your support in these moves. Let your Division know they have your support; when faced with a need to increase subscriptions we are always hesitant. It's not that we do not wish to pay the increase ourselves, it's just that we are worried about the other fellow. We are all "other fellows"—let your Division know that they do not have to fear a general exodus if they increase the fees.

Secondly, each of you can do something to get new members. Only 54% of all licensees are members of the W.I.A. Please, take the time to have a look at the table set out on page 16 of the April 1970 issue. The 46% who are not members take the benefit of the privileges obtained and the protection given by the W.I.A. No membership drives can be as successful as the efforts of each individual member to get new members. The more members we have to share the burden, the lighter the burden is on each individual.

Yes, I would rather have written a Federal Comment dealing with the achievements of the Institute, but this matter cannot wait until February. In my report to the Federal Council last year I said that I believed that the Institute can justify the support it needs.

May we count on your support?

—MICHAEL OWEN, VK3KI,
Federal President, W.I.A.

La Balsa—a Triumph for Amateur Radio

By DON MARSHALL*

THE search could be likened to looking for a needle in a haystack. In fact, it was for little more than a switch click somewhere in the Pacific Ocean south of the Equator!

The fact that through the perseverance of Amateur Radio operators in at least four countries, and perhaps only because of their discovery, has the incredible story of La Balsa been told.

It is now history that Vital Alsar, a Spaniard, Marc Modena, a Frenchman, Normand Tetreault, a Canadian, and Gabriel Salas, a Chilean, left Ecuador, South America, on a balsawood log raft last May 29.

On November 4 at 11.50 p.m., they arrived under tow in the Mooloolaba River, 65 miles north of Brisbane, after a voyage of 8,500 miles.

The report of their Amateur Radio activities during that time, as compiled from the men and operators, will have a special place in the minds of all who took part or who at least heard the raft signals.

Although Vital Alsar was primarily an adventurer seeking to prove that an ancient type raft could be sailed with some direction, he also realised some modern radio gear, together with a petrol generator and a fuel supply, would be a necessity on his raft.

On the advice of his friend, Vice-Admiral Samuel Fernandes, a Mexico City Ham, XE1EB, and radio co-

ordinator Raphael L. Corcuera, XE1EEI, a business man, of Guadaluajara, Mexico, Vital installed a Hallicrafters SR-150 transceiver.

Installation was under the eye of electronics engineer Joe HC2OM, of Guayaquil, Ecuador, where the raft was built.

Vital was given the call sign of HC9EBP/MM.

The transceiver was largely pre-set to operate on about 14,105 KHz. to limit operating time and thus exposure to the sea air.

The radio was stored in the plaited cane cabin and protected by eight plastic bags.

The aerial was a quarter wave loaded vertical mounted on two insulators taped to the starboard leg of the mast with a lead into the cabin.

Transmissions after the raft started its cross-Pacific drift were good with regular s.s.b. contacts to Fernandes and Corcuera and later with Liliana HC2IS.

Vital joined in La Rueda, the wheel in Spanish but radio net in English, every four days with hardly any interference.

Besides the Mexican and Ecuador stations, there were calls from Nicaragua, San Diego (California) and Montreal (Luc VE2BBS).

Raphael was even able to arrange a rendezvous with a U.S. Navy ship when the La Balsa was down to half a gallon of petrol from an original 17 gallons—enough only for an hour and a half's operating.

MICROPHONE USELESS

In mid-September came a storm in which waves reached 30 feet and the transceiver in its plastic bags was put under the ceiling for safety as water swept through the cabin. Some shack!

It was little wonder then that on October 3 with the raft east of New Caledonia and approaching the most dangerous part of the voyage, the microphone became faulty.

The next day it failed.

Vital tinkered with it while Raphael and the Admiral, so far away, wondered what to do.

But Vital shorted out the insert so that by pushing the microphone switch he could trigger a signal.

The Admiral devised the system where Vital could give an affirmative answer by pressing the microphone switch and remaining silent for a negative answer.

Then by transmitting digits one-two-three and so on, and listening in between each, he could get a signal from Vital giving the raft's longitude, latitude, air and sea temperatures, wind direction and strength, sea conditions and the condition of those on board.

ZL THEN VK HELP

Enter into this strange communication, Mr. A. T. "Gus" Knox, ZL1RO, of Epsom, Auckland, an Air New Zealand operations man.

The Mexicans explained all and said that although the raft seemed to hear



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Raft discussion. From left: Keith VK4KS, Marc Modena, Normand Tetreault, Vital Alsar and Gabriel Sales. Photo courtesy The Courier-Mail, Brisbane.

them without difficulty, they were having growing difficulty in hearing the reply clicks as the raft drifted west.

At this time, the signals were traveling more than 6,500 miles.

Gus offered to help since with his rotating beam he could hear the clicks easily and his signal on the raft was strong.

This was October 10 and the raft was in danger from the D'Entrecasteaux Reefs ahead, a danger apparently not realised by the men back in Mexico.

A suggestion that a new microphone be dropped from the air was not taken up.

Luckily, the raft passed the northern end of New Caledonia and headed west in the current towards Australia.

On October 12, the raft's position was 162 deg. 43 min. E., 17 deg. 38 min. S., and from that day an alternate day schedule was kept.

For three weeks, Gus hurried home from his job to relay the Mexicans' questions and to relay the clicked replies.

Meanwhile in Sydney, Syd Molen, VK2SG, a senior t.v. technician, had heard about the proposed drift from Raphael, one of his regular contacts.

He had listened on the set frequency but had never talked to La Balsa, so as not to waste the raft's power.

Raphael asked Syd if he would have a go at taking over contact with the raft and Syd made his first contact on his home-brew gear from his 12 ft. x 12 ft. shack at Pendle Hill on Oct. 24.

Then it was his turn to take over from Gus and transmit the questions and then the replies. Gus stood by.

By October 28, the sea temperature had risen 3°C. in two days, which tended to confirm that they were encountering a warm current from the Coral Sea.

Australia was near at hand, but then there were the treacherous Great Barrier Reefs ahead.

By October 29, Les Bell, VK4LZ, a farmer, of Airlie Beach, near Proser-

pine, North Queensland, and Keith Schleicher, VK4KS, of Aspley, Brisbane, had joined in the relays.

NEWS BREAKS

The first news reports appeared.

It was important that Les and Keith joined in, along with several others known to be listening on the side, since the raft was approaching the Swain Reefs, east of Rockhampton, the southern end of the main Barrier Reef.

By 1.45 p.m. E.A.S.T. on Saturday, October 31, there can be little doubt that scores of beams, including that of Raphael in Guadalajara, and a Solo-

mon Is. man to the north, were swinging to the Coral Sea area.

This scheduled sked had been published in newspapers and broadcast on radio and tv.

But such was the discipline of all that Syd and Les between them, with Gus and the Solomon Is. station on the side, were able to make contact at 2 p.m. and there was only one breaker for a brief time.

The raft was then becalmed some 250 miles odd out from Rockhampton.

This day, the Brisbane Sunday Mail newspaper spent hundreds of dollars on an aircraft charter to spot and photograph the raft, but, unfortunately, the plane had to return from the area before the raft's exact position was transmitted.

The newspaper telephoned Gus and Raphael to confirm that the raft and its signal were no hoax.

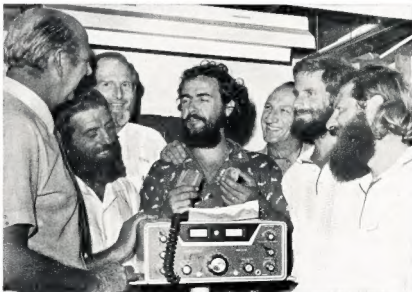
Air Force authorities in Townsville declined news media requests to put one of their Neptune aircraft specially equipped for sea searching into the air. No request had come from Canberra.

Otherwise, official statements that there was no raft, that such a drift was impossible and that the radio signals were a hoax might never have been made.

It was revealed later that the authorities did not have the equipment to pick up the raft's signals. Nor did they have the beam aeriels of the Amateurs concerned that were confirming the raft's position.

SEARCH PERMIT REFUSED

On Sunday, November 1, Civil Aviation Department officers in Rockhampton refused permission to allow a twin-engined aircraft proposed chartered by the Australian Broadcasting Commis-



Hellfire Transceiver back for the La Balsa crewmen at a Brisbane DX Radio Club function at the OTH of Keith VK4KS at Aspley, Brisbane, on November 13. Picture shows (from left) Club President Mr. C. I. Patterson, Gabriel Sales, W.I.A. Queensland Division President Norm Wilson (VK4NP), Vital Alsar, Keith Schleicher (VK4KS), Marc Modena and Normand Tetreault. Photo courtesy The Courier-Mail, Brisbane.

sion and then later by the Brisbane Courier-Mail to search for the raft since the search area was too far off the coast.

For reporters and photographers, a major news event was so near and yet so far, and reporters had to rely on Amateur Radio reports.

On Monday, November 2, from 2 p.m. E.A.S.T., there was the normal position report. The raft was sailing south towards Brisbane and all was well. There was a similar report on the Tuesday with Les and Syd making the contact.

Crisis day came on Wednesday, November 4, when the raft reported its position at 154 deg. 20 min. E., 26 deg. 05 min. S., or about 66 miles north-east of Double Island Point on the Australian mainland.

The raft was being buffeted by a 30-knot south-easter. The crew were all well but were worried by the strong wind.

As they felt they were within Australian waters and near landfall, they thought it advisable to request assistance to stand by.

Following the report, two newspapers put separate aircraft up to search for the raft, but in poor visibility and falling light, it was not sighted.

At Airlie Beach, Les offered to stay up all night keeping a listening watch on the frequency. At Syd's suggestion, the raft was back on the air at 8 p.m. It was then only 16 miles east-north-east of Double Island Point with a 30-knot south-easter still blowing.

At Mooloolaba, 50 miles to the south, a pilot landing with a doctor on board put to sea to search unsuccessfully and returned to port soon after midnight.

At 2 a.m. on Thursday, November 5, the fishing launch Capri, chartered by the local Nambour newspaper, left Mooloolaba to search.

By 5 a.m., the Mexicans were back on the air asking Vital his position, which was two miles off Double Island Point. However, lighthouse men there could not see the raft.

At this time, skip distance prevented Brisbane Amateurs from hearing the raft. It was Syd who asked the questions and Les confirmed the raft's replies.

The untold scores of Amateurs who must also have been listening did not break in.

SEEN FROM THE AIR

As air-sea rescue authorities were still maintaining the whole matter was a hoax, the raft was spotted from the air.

After Syd was unable to reach Brisbane authorities by telephone, he asked Keith VK4KS, standing by in Brisbane, to contact them to see if Syd's services were still required. The authorities released Syd and took control.

The raft was later taken in tow by the Capri and it reached Mooloolaba at 11.50 p.m. E.A.S.T.

W.I.A. OFFICIALS

AT WELCOME

There to welcome them on behalf of Amateurs were the W.I.A. Queensland Div. President Norm Wilson (VK4NP), Vice-President Theo Marks (VK4MU), Keith VK4KS and Ken Chiverton (VK4VC).

About 2.30 a.m., Vital was at Norm's station wagon to contact the Admiral (XE1EB) to confirm the end of a fantastic voyage.

But all was not ended there so far as Amateurs were concerned.

The next day Vital paid a visit to the shack of Kev in Nambour and while there was able to communicate with Mexico and Ecuador.

On Friday, November 13, the four crewmen were in Brisbane and visited the shack of Keith for a late lunch and again were able to have a few words with XE1EEI, XE1EB and HC2OM.

Then on Sunday, November 15, they returned to Keith's for a dinner in their honour, given by the Brisbane DX Radio Club and attended by 50 members and their wives.

At this, Vital was presented with a club certificate and made an honorary member. Here, too, the men received back their transceiver, repaired to first class condition.

Salt water spray had got inside and the microphone had been damaged by electrolysis action. Also, the transmitter was putting out only 30 watts, two tubes were "soft" and tuning was poor. Luck had prevailed!

The debt to all Amateur operators involved with La Balsa from Ecuador to Australia has been acknowledged many times since by Vital.

But who would take anything from the magnificence of the feat by four brave men?

TECHNICAL ARTICLES

Readers are requested to submit articles for publication in "A.R." in particular constructional articles, photographs of stations and gear, together with articles suitable for beginners, are required.

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HOW MANY MIKES?

COL HARVEY,* VK1AU

Not for the audiophile—but a simple approach to the problem of testing capacitors in the tens of microfarads range

The long standing practice of bridging a replacement capacitor across a suspect electrolytic has much to commend it, particularly in filter and decoupling applications. However, in solid state equipment where even interstage coupling capacitors are likely to be many microfarads, it is generally a nuisance to remove suspect capacitors for test, and more a problem to prove capacitor value and serviceability. As very few Amateurs seem to have access to a polarized capacity bridge, a simple self contained capacity and leakage tester can be a useful substitute. The method used does not give absolute readings, but compares the suspect component with a calibration obtained from newish similar items.

Experience to date shows that capacitor values measured for electrolytics are higher than the equivalent values given by paper capacitors. Apart from the effect of differing leakage, no explanation for this has been attempted. The problem is easily overcome, however, by using a supplementary calibration for paper capacitors in the microfarad range.

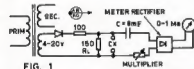


Fig. 1.—The Capacity Meter.

Values are not critical. C is needed to keep d.c. off the meter rectifier. Set meter to full scale by adjustment of the multiplier before connecting condenser under test. Choose a value for the multiplier which will allow f.s.d. with the voltage and meter available.

The concept of the tester is that it should be simple and cheap, should cover the range 5 to 200 μ F, provide a leakage test and allow measurements to be made without having to disconnect the suspect item.

Take any half wave a.c. to d.c. rectifier and apply the output to a load resistor. If there is no filter, there will be a substantial a.c. component across the load. A low range a.c. voltmeter can be coupled across the load and the multiplier set to give a full scale reading of the ripple. The more substantial the capacity subsequently placed across the load, the lower the meter reading of ripple. Calibration is then achieved by the simple expedient of recording meter readings against the labelled value of newish capacitors in series-parallel combinations to cover the preferred values in the range 0-200 μ F.

Since testing is incomplete unless we have an assurance that leakage is within reasonable limits, we also need to

provide an adjustable source of reasonably pure d.c., and a means of indicating within broad limits the amount of leakage. With low value mica/ceramic capacitors a conventional neon lamp is well proven, but with the higher leakage of electrolytics a less sensitive indication is needed. The meter used to display capacity can therefore be switched (and shunted as required) to read leakage.

There is considerable freedom in the way in which an appropriate test voltage can be obtained, ranging from a simple half wave supply with no choice of voltage; through a voltage doubler arrangement with switched voltage divider networks to provide precise ratings for test. However, with a 250 volt supply, providing a push to test switch is provided, a 2 watt 50K potentiometer can be calibrated to show the approximate voltage available for test. The ultimate choice depends mainly on the characteristics of the available transformer and the size of the instrument cabinet which is to be used.

In practice only one important refinement is needed to the simple capacity test circuit described above. If the capacitor under test, or the test leads are shorted, the output of the transformer rectifier will also be shorted. To avoid the smell of burning insulation, a series resistor of about 50-100 ohms must be used in series with the load resistor. Since both resistors will dissipate about 6 watts (depending on transformer voltage), it is necessary to use wire wound bias resistors together with a diode that will handle 60 mA. plus the peak charging current.

So far as the transformer secondary voltage is concerned, any voltage between 4 and 40 can be used, providing the series resistor is altered to maintain about 5 watts dissipation in the load, and that the meter multiplier is varied to permit full scale deflection with whatever end-voltage results. It is a slight advantage to have some portion of the meter multiplier adjustable from the front panel, so that the scale can be set before each set of readings of capacity.

The meter full scale deflection is not significant either, but the combination of a 6-12 volt transformer secondary and an 0-1 mA. meter has proved very satisfactory. Almost any available junk box combination can be fiddled into a satisfactory device. However, don't forget the low value blocking capacitor to keep d.c. off the meter rectifier.

After the instrument is completed, it is wise to measure the d.c. voltage across the load resistor, so that tests on small electrolytics of lesser working voltage can be avoided.

Calibration is not linear, but the difference between 5 and 8 μ F. can be seen easily. If the readings of newish electrolytics are graphed, it is a simple matter to extract scale readings corresponding with preferred values, such as 8, 16, 25, 40, 50, 64, 100, 160 μ F. By using a parallel rheostat across the test capacitor, the value of in-circuit shunt resistance which will affect the accuracy of readings can be found. In general, a 1,500 ohm bias resistor across 25 μ F. will not affect the reading.

As with most test procedures, a few clues as to interpretation of results are sometimes needed. With this gadget—

- A shorted capacitor reads 200 μ F.
- A leaky capacitor shunts the ripple and consequently gives an erroneously high capacity reading. If the capacity reading is more than about 20% high on the labelled value—suspect a leaky capacitor and test further.
- Readings less than the labelled value are likely to be valid.
- A low voltage electro run at higher than rated d.c. voltage will initially show excessive capacitance, soon followed by a progressive drop to a low reading of capacity, probably accompanied by overheating.
- Paper capacitors although labelled the same value as electros, do not produce the same scale reading.

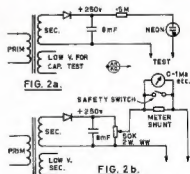


Fig. 2a.—Simple Leakage Tester.

For use with paper and mica capacitors. If electrolytics are to be tested frequently, it would be better to make provision for a meter indication of leakage as well.

Fig. 2b.

Addition of a potentiometer calibrated for voltage, allows low voltage electro to be checked. The safety switch is needed as a precaution against high charging currents. A normally closed push button switch (such as is used for refrigeration lights) would be ideal. For clarity, switching has been omitted.

*16 Leane St., Hughes, A.C.T., 2030.

HARMONICS

LECTURE No. 10B

C. A. CULLINAN,* VK3AXU

Now it is rather unfortunate that if we operate a valve in its most linear condition its efficiency is low, but luckily it is possible to operate under certain conditions with a considerable increase in efficiency whilst retaining low distortion characteristics.

Let us make some comparisons, taking data from an A.W.V. valve data book after detailing some definitions.

CLASS OF SERVICE

Class A Amplifier

This is a valve amplifier in which the grid bias and the alternating grid voltages are such that plate current in a specific valve flows at all times.

The ideal class A amplifier is one in which the alternating component of the plate current is an exact reproduction of the form of the alternating voltage applied to the grid and plate current flows during the entire 360 degrees of the electrical cycle.

The characteristics of a class A amplifier are low output and low efficiency.

The efficiency of a class A amplifier may lie between 25% and 30%. One main characteristic is that grid current never flows during any part of the exciting voltage cycle.

In most valve type receivers the r.f. stages operate in class A. Also in the early days of radio telephony, using valves, the modulator valves were operated in class A.

Class AB Amplifier

An amplifier in which the grid bias and the applied alternating grid voltages are such that plate current in a specific valve flows for appreciably more than half but less than the entire electrical cycle.

The characteristics of a class AB amplifier are greater output and greater efficiency than a class A amplifier. However, the plate current will not remain steady. The bias is such that without an exciting voltage at the grid, the plate current will be lower than in class A operation and will rise considerably as the exciting voltage increases.

Class AB amplifiers are divided into two types known as AB1 and AB2.

In class AB1 amplifier grid current never flows during any portion of the grid excitation, but the efficiency is greater than in a class A amplifier.

But in class AB2 operation grid current does flow during part of the exciting voltage cycle and greater power can be obtained because the efficiency is still greater.

Class B Amplifier

An amplifier in which the grid bias is approximately equal to the plate current cut-off value so that plate current is approximately zero when no grid exciting voltage is applied, so that plate

Continuing the series of lectures by C. A. Cullinan, VK3AXU, at Broadcast Station 3CS for students studying for a P.M.G. Radio Operator's Certificate.

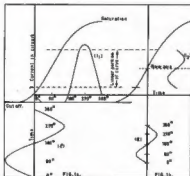
current in a specific valve flows for approximately one half of each cycle when an alternating voltage is applied to the grid.

The characteristics of a class B amplifier are high output and high efficiency (up to 78%).

However, there is a price to pay for this in that grid current may flow for almost the whole of the half cycle, the plate current without grid excitation is low but rises to a very high value with full excitation, hence the regulation of the driver amplifier and that of the power supply must be extra good.

The wave-form of such an amplifier would be generally similar to the current wave 12 in Fig. 1b, from the time axis upwards, with the top made to look more like a sine-wave.

Now as far as audio frequencies are concerned, the use of a single valve in class AB would not be of much use because of the serious distortion which would result (as per Fig. 1b), but, fortunately, there is a way out and that is by connecting two valves in what is known as push-pull.



In this connection one valve amplifies over one half of the exciting voltage cycle and the other valve amplifies over the other half cycle. (In an ideal amplifier.)

The plates of the two valves are connected to a load having the h.t. applied to the centre tap. Usually the load will take the form of a transformer having a centre-tapped primary, into which the actual load has been reflected.

If the two halves of the primary are well balanced as regards inductance, self-capacitance and resistance, then

the output of each valve will combine to produce a complete electrical cycle in the transformer, for each complete cycle of grid exciting voltage, also even-order harmonics (2nd, 4th, 6th, etc.) will cancel and in practice the even-order harmonics, particularly the 2nd, will be virtually non-existent, therefore it becomes possible to obtain good quality audio frequency power from class AB or class B operation. Also, push-pull operation may be applied to two valves in class A.

Class C Amplifier

This is an amplifier in which the grid bias is appreciably greater than the cut-off value so that the valve plate current is zero when no alternating grid voltage is applied, and so that the plate current in a specific valve flows for appreciably less than one half of each cycle when an alternating grid voltage is applied.

The characteristics of a class C amplifier are high plate circuit efficiency and high power output. However, as plate current flows only over portion of the grid voltage cycle there will be a considerable departure from linearity between the grid and plate wave-forms.

Class C amplifiers find their main use in radio frequency applications. For such purposes the valve operates into a tuned circuit, usually known as a "tank circuit" and this has the property of appearing as a "fly-wheel" converting the plate current pulses into a sine-wave usually with considerable harmonic content. Two valves used in class C operation in push-pull will have little even-order harmonic distortion due to the reduction of the even order harmonics because of the push-pull connection.

A similar state of affairs exists if a class B amplifier is operated at radio frequencies and it is possible to obtain excellent linearity if the valve and its associated circuits are correctly adjusted. Such an amplifier is often referred to as a linear amplifier.

Unfortunately a valve used as a class B radio frequency amplifier has low efficiency, about 33% and attempts to make it more efficient frequently cause considerable harmonic and intermodulation distortion.

Valve type 6L6 was developed before World War II, and has been a very popular valve. Although designed for audio frequency work, Radio Amateurs soon found that it was excellent at radio frequencies for transmitters, and later a variant called an 807 was developed expressly for high power audio and radio frequency work.

To illustrate the operation of valves as amplifiers under the various classes of operation, we are listing some of those for 6L6 and 807s from the A.W.V. valve data books, 6L6G is a glass envelope equivalent of the 6L6.

* 6 Adrian Street, Colan, Vic., 2250.

Type 6L6

Single Valve—Class A

Plate voltage	250 v.
Screen voltage	250 v.
Grid voltage	-14 v.
Peak a.f. grid voltage	14 v.
Zero signal plate current	72 mA.
Max. signal plate current	78 mA.
Zero signal screen current	5 mA.
Max. signal screen current	7.3 mA.
Load resistance (pl. to pl.)	2500 ohms
Max. signal power output	6.5 watts
Total harmonic distortion	10%

This valve is a tetrode and under class A operation there is a slight change in plate current. Grid current does not flow, however plate current flows at all times.

Note that there is a very high total harmonic distortion.

Let us compare what happens if two 6L6 valves are operated in class A push-pull for the same plate and screen voltages (for two valves).

Plate voltage	250 v.
Screen voltage	250 v.
Grid voltage	-18 v.
Peak grid to grid voltage	32 v.
Zero signal plate current	120 mA.
Max. signal plate current	140 mA.
Zero signal screen current	10 mA.
Max. signal screen current	15 mA.
Load resistance (pl. to pl.)	5000 ohms
Max. signal power output	14.5 watts
Total harmonic distortion	2%

Comparison of these two sets of data shows that the push-pull connection gives more than twice the output of a single valve, also that the total distortion has dropped to 2%.

By increasing both the plate and screen voltages as well as the grid bias, it is possible to operate two 6L6s in class AB1 push-pull and keep within the maximum ratings for the valves.

Here is one set of data for two valves.

Class AB1

Plate voltage	360 v.
Screen voltage	270 v.
Grid bias voltage	-22.5 v.
Peak a.f. grid to grid	45 v.
Zero signal plate current	88 mA.
Max. signal plate current	132 mA.
Zero signal screen current	5 mA.
Max. signal screen current	15 mA.
Load resistance (pl. to pl.)	6000 ohms
Max. signal power output	26.5 watts
Total harmonic distortion	2%

For this mode of operation there has been almost twice the power output as obtained from the same valves in class A push-pull, and the total harmonic distortion has remained the same. However, it must be pointed out that there is considerable variation in plate current and the screen voltage should be stabilised to keep it at 270 volts. Also, the regulation of the power supply must be very good to keep the h.f. voltage constant as the plate current swings from 88 mA. to 132 mA.

Grid current. Note that in all the examples given so far the peak grid exciting voltage does not exceed the bias voltage on either positive or negative peaks, hence grid current does not flow, nor is the valve driven beyond plate current cut-off.

Class AB2

Plate voltage	360	400 v.
Screen voltage	270	300 v.
Grid bias voltage	-22.5	-25 v.
Peak a.f. g.-g. voltage	42	80 v.
Zero sig. plate current	88	102 mA.
Max. sig. plate current	205	230 mA.
Zero sig. screen current	5	5 mA.
Max. sig. screen curr't	11	20 mA.
Load resistance (plate to plate)	3800	3800 ohms
Max. sig. power output	47	60 watts
Total harm. distortion	2%	—
Peak grid pow. input	270	350 mW.

Two sets of operating conditions have been given. In the first set of data (A.W.V.) the major change from class AB1 operation is in the plate to plate load resistance. However, the grids are now driven into grid current on the positive peaks of the exciting grid voltage and as a result considerably more plate current flows.

However, there are penalties to be made good. The grids require 270 milliwatts of driving power, which means that the driver stage must have good regulation as it supplies this power. Also, the regulation of the plate and screen supplies must be very good.

The second set of data (R.C.A.) shows that with an increase in plate and grid bias voltages and an increase in grid driving power up to 60 watts output can be obtained. However, no distortion figures are quoted.

It would appear that 47 watts output is the maximum that two 6L6 valves can deliver in class AB2 push-pull operation. Above this there is great danger of internal breakdown in the valves.

However, the 807 is essentially a 6L6 valve with different external appearance. The plate is brought out to a metal cap on the top of its glass envelope and the base uses a "low loss" UY configuration.

For Continuous Commercial Service (C.C.S.) the 807 may be operated with

the same ratings as for the 6L6, but for Interim Commercial and Amateur Service (I.C.A.S.) it is possible to get as much as 120 watts from two 807s in class AB2 push-pull operation.

No data is available for 6L6 or 807 valves for operation as class B audio frequency amplifiers.

All the data presented so far shows that class A operation is the least efficient, although the simplest, and that to obtain greater power from a specific valve it is necessary to use more than one valve in one of the other classes or several valves in parallel.

It is possible to operate in class A, AB1, AB2 and B so that the distortion in the output wave is very low, but the power output, too, will be low, also there is an enormous difference in the linearity between input and output wave forms for different types of valves.

Important.—It must be thoroughly understood that data in valve handbooks refers to an ideal amplifier and such things as power output and distortion are those to be obtained at the valve or valves' plates. The output coupling device is not considered so in designing amplifiers the losses and any distortion in the coupling system must be taken into account.

It is possible to build valve amplifiers with nominally 1% total harmonic distortion and this can be reduced further if negative feedback is employed.

(to be continued)

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Results of the 1970 Victorian 432 MHz. Antenna Gain Contest

By J. JENNINGS,* VK3AVJ

Incorporated in the 1970 Victorian V.H.F. Convention held in Melbourne over the week-end of October 10 and 11 was a contest in which the gains of 432 MHz. antennas were measured.

The results are as follows:

Type	Submitted by	Gain dB.
32 element extended-expanded colinear ...	VK3ZYO	16
32 element extended-expanded colinear ...	VK3AOT	15
VK3ABP 15 element yagi ...	VK3AOT	11
12 over 12 skeleton slot ...	VK3ZTE	9
90° corner reflector ...	VK3AUI	8
VK3AGV 9 element yagi ...	VK3ZMU	7
Commercial 450 MHz. 7 over 7 skeleton slot ...	VK3AOT	5
11 element yagi ...	VK5ZDY	4
9 over 9 yagis ...	VK3ZCK	4
9 element yagi ...	VK3ZKB	2
7 over 7 skeleton slot ...	VK3AOT	2
Yagi ...	VK3AKC	1
Yagi ...	VK3ASV	1

The antenna with the lowest measured gain was a halo brought by VK3ZBJ.

MEASURING TECHNIQUE

The measuring technique used is illustrated in Fig. 1. At the beginning of each measurement a reference dipole was connected so as to receive the signal from a low power transmitter 300 ft. away. Receiver gain was adjusted for a convenient "S" meter reading with the variable attenuator in the 0 dB. position. The antenna under test was then connected in place of the reference dipole and the variable attenuator adjusted until the "S" meter reading corresponded with that for the dipole. Hence the antenna gain was read directly from the scale of the variable attenuator.

The variable attenuator used was calibrated for a 50 ohm source and load. To ensure that these conditions were met, 6 dB. pads were connected as shown in Fig. 1. Hence attenuator reading was made accurate almost regardless of antenna impedance and receiver input impedance.

Antenna gain measurements can also be effected by ground reflections. In theory results can be effected by between +6 dB. and -∞ dB., depending on the amplitude and phase difference between direct and reflected waves. It is believed that measures taken to reduce this source of error were effective since consistent results were obtained in several positions.

EVALUATION OF RESULTS

It is believed that the technique used allowed gains to be compared to within +1 dB. The absolute error cannot be determined except by estimation.

Theoretical antenna gains can be most easily determined for the colinears and corner reflector. Measured results are about 2 dB. below theoretical, which indicates that the figures for all antennas measured may be 2 dB. low. This could be attributed to the mismatch existing between the 70 ohm reference dipole and the 50 ohm transmission line and to other deficiencies of the reference dipole.

Some antennas which exhibited reasonable directivity measured very low

in gain. This probably can be attributed to (1) poor surface conductivity of elements and other resistive losses, and (2) incorrect matching between antenna and 50 ohm transmission line. Mismatch is less of a problem in normal use since the tuning and loading controls of a final amplifier will usually cater for a wide range of load impedances. Such is not the case for a mismatched antenna delivering power into a line terminated in a 50 ohm pad.

(continued on page 18)



FIG. 1. MEASURING TECHNIQUE

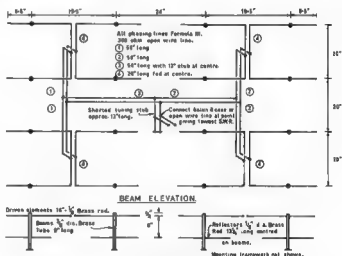


FIG. 2. 432 MHz. COLINEAR ARRAY WITH MEASURED GAIN OF 16 DB.

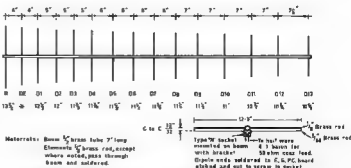


FIG. 3. 432 MHz YAGI. BASED ON DESIGN BY VK3ABP

* 11 Dunbar Avenue, Caulfield, Vic., 3181.

AUSTRALIAN DX CENTURY CLUB AWARD

OBJECTS

- 1.1 This Award was created in order to stimulate interest in working DX in Australia and to give successful applicants some tangible recognition of their achievements.
- 1.2 This Award, to be known as the "DX Century Club" Award, will be issued to any Australian Amateur who satisfies the following conditions.
- 1.3 A certificate of the Award will be issued to the applicants who show proof of having contacted one hundred countries, and will be endorsed as necessary, for contacts made using only one type of emission.

REQUIREMENTS

- 2.1 Verifications are required from one hundred different countries as shown in the Official Countries List.
- 2.2 The Official Countries List will be published annually in "Amateur Radio" and will be amended from time to time as required. Should a country be deleted from the Countries List at any time, members and intending members will be credited with such country if the date of contact was before such deletion.
- 2.3 The commencing date for the Award is 1st January 1946. All contacts made on or after this date may be included.

OPERATION

- 3.1 Contacts must be made in the H.F. Band (Band 7) which extends from 3 to 30 MHz, but such contacts must only be made in the authorized Amateur Bands in Band 7.
- 3.2 All contacts must be two-way contacts on the same band. Cross-band contacts will not be allowed.
- 3.3 Contacts may be made using any authorized type of emission for the band concerned.

3.4 Credit may only be claimed for contacts with stations using regularly-assigned Government call signs for the country concerned.

3.5 Contacts made with ship or aircraft stations will not be allowed, but land-mobile stations may be claimed provided their specific location and the type of contact is clearly shown on the verification.

3.6 All stations must be contacted from the same call area by the applicant (except as below), although if the applicant's call sign is subsequently changed, contacts will be allowed under the new call sign providing the applicant is still in the same call area.

If the applicant moves to another call area, contacts must be made from within a radius of 150 miles of the previous location to qualify for award purposes. If the distance of the new location from the old exceeds a radius of 150 miles, a separate application for a new award must be made claiming only contacts made from the new location.

3.7 All contacts must be made when operating in accordance with the Regulations laid down in the "Handbook for the Guidance of Operators of Amateur Wireless Stations" or its successor.

VERIFICATIONS

4.1 It will be necessary for the applicant to produce verifications in the form of QSL cards or other written evidence showing that two-way contacts have taken place.

4.2 Each verification submitted must be exactly as received from the station contacted, and altered or forged verifications will be grounds for disqualification of the applicant.

4.3 Each verification submitted must show the date and time of contact, type of emission and frequency band used, the report and the location or address of the station at the time of contact.

4.4 A check list must accompany every application setting out the details for each claimed station, in accordance with the details required in Rule 4.3.

APPLICATIONS

5.1 Applications for membership shall be addressed to the Federal Awards Manager, W.I.A., P.O. Box 47, East Melbourne, Vic., 3002, accompanied by the verifications and check list with sufficient postage enclosed for their return to the applicant, registration being included if desired.

5.2 A nominal charge of 25c, which shall also be forwarded with the application, will be made for the issue of the certificate to successful applicants who are non-members of the Wireless Institute of Australia.

5.3 Successful applicants will be listed periodically in "Amateur Radio". Members of the D.X.C.C. wishing to have their verified country totals, over and above the one hundred necessary for membership, listed will notify these totals to the Federal Awards Manager.

5.4 In all cases of dispute, the decision of the Federal Awards Manager and two officers of the Federal Executive of the W.I.A. in the interpretation and application of these Rules shall be final and binding.

5.5 Notwithstanding anything to the contrary in these Rules, the Federal Council of the W.I.A. reserves the right to amend them when necessary.

AUSTRALIAN V.H.F. CENTURY CLUB AWARD

OBJECTS

- 1.1 This Award has been created in order to stimulate interest in the V.H.F. bands in Australia, and to give successful applicants some tangible recognition of their achievements.
- 1.2 This Award, to be known as the "V.H.F. Century Club" Award, will be issued to any Australian Amateur who satisfies the following conditions.
- 1.3 Certificates of the Award will be issued to the applicants who show proof of having made one hundred contacts on the V.H.F. bands, and will be endorsed as necessary, for contacts made using only one type of emission.

REQUIREMENTS

- 2.1 Contacts must be made in the V.H.F. Band (Band 8) which extends from 30 to 300 MHz, but such contacts must only be made in the authorized Amateur Bands in Band 8.
- 2.2 In the case of the authorized bands between 30 and 100 MHz, verifications are required from one hundred different stations at least seventy of which must be Australian. The Amateur Bands 30 to 30 MHz and 50 to 60 MHz will be counted as one band for the purposes of the Award.
- 2.3 In the case of the authorized Amateur Band between 100 to 300 MHz, verifications from one hundred different stations are required.
- 2.4 It is possible under these rules for one applicant to receive two certificates, one for each of the authorized Amateur Bands nominated in Rules 2.2 and 2.3.
- 2.5 The commencing date for the Award is 1st June 1946. All contacts made on or after this date may be included.

OPERATION

- 3.1 All contacts must be two-way contacts on the same band, and cross-band contacts will not be allowed.
- 3.2 Contacts may be made using any authorized type of emission for the band concerned.

3.3 Fixed stations may contact portable/mobile stations and vice versa, but portable/mobile station applicants must make their contacts from within the same call area.

3.4 Applicants, when operating either portable/mobile or fixed, may contact the same station licensee, but may not include both contacts for the same type of endorsement.

3.5 Applicants may only count one contact for a station worked as a limited licensee with a Z call sign who is subsequently contacted as a full A.O.C.P. holder.

3.6 All stations must be contacted from the same call area by the applicant (except as below), although if the applicant's call sign is subsequently changed, contacts will be allowed under the new call sign providing the applicant is still in the same call area.

If the applicant moves to another call area, contacts must be made from within a radius of 150 miles of the previous location to qualify for award purposes. If the distance of the new location from the old exceeds a radius of 150 miles, a separate application for a new award must be made claiming only contacts made from the new location.

3.7 All contacts must be made when operating in accordance with the Regulations laid down in the "Handbook for the Guidance of Operators of Amateur Wireless Stations" or its successor.

VERIFICATIONS

4.1 It will be necessary for the applicant to produce verifications in the form of QSL cards or other written evidence showing that two-way contacts have taken place.

4.2 Each verification submitted must be exactly as received from the station contacted, and altered or forged verifications will be grounds for disqualification of the applicant.

4.3 Each verification submitted must show the date and time of contact, type of emission and frequency band used, the report and the location or address of the station at the time of contact.

4.4 A check list must accompany every application setting out the following details:-

4.4.1 Applicant's name and call sign, and whether a member of the W.I.A. or not.

4.4.2 Band for which application is made, and whether special endorsement is involved.

4.4.3 Where applicable, the date of change of call sign and previous call sign.

4.4.4 Details of each contact as required by Rule 4.3.

4.4.5 The applicant's location at the time of each contact if portable/mobile operation is involved.

4.4.6 Any relevant details of any contact about which some doubt might exist.

APPLICATIONS

5.1 Applications for membership shall be addressed to the Federal Awards Manager, W.I.A., P.O. Box 47, East Melbourne, Vic., 3002, accompanied by the verifications and check list with sufficient postage enclosed for their return to the applicant, registration being included if desired.

5.2 A nominal charge of 25c, which shall also be forwarded with the application, will be made for the issue of the certificate to successful applicants who are non-members of the Wireless Institute of Australia.

5.3 Successful applicants will be listed periodically in "Amateur Radio". Members of the V.H.F.C.C. wishing to have their verified totals, over and above the one hundred necessary for membership, listed will notify these totals to the Federal Awards Manager.

5.4 In all cases of dispute, the decision of the Federal Awards Manager and two officers of the Federal Executive of the W.I.A. in the interpretation and application of these Rules shall be final and binding.

5.5 Notwithstanding anything to the contrary in these Rules, the Federal Council of the W.I.A. reserves the right to amend them when necessary.

AUSTRALIAN D.X.C.C. COUNTRIES LIST

Phone C.W.

Phone C.W.

A2C, ZS8 Botswana
AC3-Sikkim
AC4-Tibet
AC5-Bhutan
AP-East Pakistan
AP-West Pakistan
BV-Taiwan
BY-China
C21, VK8-Nauru
C31, PX-Andorra
CE-Chile
CE9AA-AM, FB8Y, KC4AA-US, LA,
LU-Z, OR, UA1, VK0, VP8, ZL3,
8J-Antarctica
CE0A-Easter Is.
CE0X-San Felix
CE0Z-Juan Fernandez
CM, CO-Cuba
CN-Morocco
CP-Bolivia
CR3-Portuguese Guinea
CR4-Cape Verde Is.
CR5-Principe, Sao Thome
CR6-Angola
CR7-Mozambique
CR8-Portuguese Timor
CR9-Macao
CT1-Portugal
CT2-Azores
CT3-Madeira
CX-Uruguay
DJ, DK, DL, DM-Germany
DU-Philippine Is.
EA-Spain
EA6-Balearic Is.
EA8-Canary Is.
EA9-Rio de Oro
EA9-Spanish Morocco
EI-Republic of Ireland
EL-Liberia
EP-Iran
ET3-Ethiopia
F-France
FB8W-Crozet Is.
FB8X-Kerguelen Is.
FB8Z-Amsterdam and St. Paul Is.
FC-Corsica
FG7-Guadeloupe
FH8-Comoro Is.
FK8-New Caledonia
FL8-French Somaliland
FM7-Martinique
FO8-Clipperton Is.
FO8-French Oceania
FO8M-Maria Theresa
FP8-St. Pierre and Miquelon
FR7-Gloriosa Is.
FR7-Juan de Nova
FR7-Reunion Is.

FR7-Tromelin
FS7-Saint Martin
FW8-Wallis and Futuna Is.
FY7-French Guiana and Inini
G, GB-England
GC-Guernsey and Dependencies
GD-Jersey Is.
GD-Isle of Man
GI-Northern Ireland
GM-Scotland
GW-Wales
HA, HG-Hungary
HB8-Switzerland
HB0-Liechtenstein
HC-Ecuador
HC8-Galapagos Is.
HH-Haiti
HI-Dominican Republic
HK-Columbia
HK0-Bajo Nuevo
HK0-Malpelo Is.
HK0-Sn Andres and Providencia
HL, HM-Korea
HP-Panama
HR-Honduras
HS-Thailand
HV-Vatican
HZ, 7Z-Saudi Arabia
I, IT-Italy
IS1-Sardinia
JA, JH, JR, KA-Japan
JD1, KA1, KG61-Bonin and Volcano Is.
JD1, KA1, KG61-Marcus Is.
JT-Mongolia
JW-Svalbard
JX-Jan Mayen
JY-Jordan
K, KN, W, WA, WB, WN-United States
of America
KB6-Baker, Howland and American
Phoenix Is.
KC4-Navassa Is.
KC6-Eastern Caroline Is.
KC8-Western Caroline Is.
KG4-Guantanamo Bay
KG6-Guam
KG6-Mariana Is.
KH6, WH6-Hawaiian Is.
KH6-Kure Is.
KJ6-Johnston Is.
KL7, WL7-Alaska
KM6-Midway Is.
KP4, WP4-Puerto Rico
KP6-Palmyra Group, Jarvis Is.
KR6, 8-Ryuku Is.
KS4-Swan Is.
KS4B, HK0-Serrana Bank and Ron-
cador Cay
KS6-American Samoa

	Phone	C.W.
KV4, WV4—Virgin Is.		
KW8—Wake Is.		
KX6—Marshall Is.		
KZ5—Canal Zone		
LA, LJ—Norway		
LU—Argentina		
LX—Luxembourg		
LZ—Bulgaria		
MP4B—Bahrein		
MP4D, T—Trucial Oman		
MP4M—Sultanate of Muscat and Oman		
MP4Q—Qatar		
OA—Peru		
OD5—Lebanon		
OE—Austria		
OH—Finland		
OH0—Aland Is.		
OJ0—Market Reef		
OK, OL—Czechoslovakia		
ON—Belgium		
OX, KG1, XP—Greenland		
OY—Faroe Is.		
OZ—Denmark		
PA, PE, PI—Netherlands		
PJ—Netherlands Antilles		
PJ—Sint Maarten		
PY—Brazil		
PY0—Fernando de Noronha		
PY0—St. Peter and St. Paul's Rocks		
PY0—Trinidad and Martin Vaz Is.		
PZ1—Surinam		
SK, SL, SM—Sweden		
SP—Poland		
ST—Sudan		
SU—Egypt		
SV—Crete		
SV—Dodecanese		
SV—Greece		
TA, TC—Turkey		
TF—Iceland		
TG—Guatemala		
TI—Costa Rica		
TI0—Cocos Is.		
TJ—Cameroun		
TL—Central African Republic		
TN—Congo Republic		
TR—Gabon Republic		
TT—Chad Republic		
TU—Ivory Coast		
TY—Dahomey Republic		
TZ—Mali Republic		
UA, UV, UW1-6, UN1—European Russian S.F.S.R.		
UA, UV, UW9, 0—Asiatic R.S.F.S.R.		
UA1—Franz Josef Land		
UA2—Kalinigradsk		
UB5, UT5, UX5—Ukraine		
UC2—White Russian S.S.R.		
UD6—Azerbaijan		
UF8—Georgia		
UG6—Armenia		
UH8—Turkoman		
UI8—Uzbek		

	Phone	C.W.
UJ8—Ta6zhik		
UL7—Kazakh		
UM8—Kirghiz		
UO6—Moldavia		
UP2—Lithuania		
UQ2—Latvia		
UR2—Estonia		
VE, VO—Canada		
VK—Australia		
VK2—Lord Howe Is.		
VK4—Willis Is.		
VK9—Christmas Is.		
VK9—Cocos Is.		
VK9—Norfolk Is.		
VK9—Papua Territory		
VK9—Territory of New Guinea		
VK0—Heard Is.		
VK0—Macquarie Is.		
VP1—British Honduras		
VP2A—Antigua, Barbuda		
VP2D—Dominica		
VP2E—Anguilla		
VP2G—Grenada and Dependencies		
VP2K—St. Kitts, Nevis		
VP2L—St. Lucia		
VP2M—Montserrat		
VP2S—St. Vincent and Dependencies		
VP2V—British Virgin Is.		
VP5—Turks and Caicos Is.		
VP7—Bahama Is.		
VP8—Falkland Is.		
VP8, LU-Z—South Georgia Is.		
VP8, LU-Z—South Orkney Is.		
VP8, LU-Z—South Sandwich Is.		
VP8, LU-Z, CE9AN-AZ—South Shetland Is.		
VP8—Bermuda Is.		
VQ1—Zanzibar		
VQ9—Aldabra Is.		
VQ9—Chagos Is.		
VQ9—Desroches		
VQ9—Farquahar		
VQ9—Seychelles		
VR1—British Phoenix Is.		
VR1—Gilbert, Ellice and Ocean Is.		
VR2—Fiji Is.		
VR3—Fanning and Christmas Is.		
VR4—Solomon Is.		
VR5—Tonga Is.		
VR6—Pitcairn Is.		
VS5—Brunei		
VS6—Hong Kong		
VS9K—Kamaman Is.		
VU—India		
VU—Laccadive Is.		
VU—Andaman and Nicobar Is.		
XE, XF—Mexico		
XF4—Revilla Gigedo		
XT2—Volcanic Republic		
XU—Cambodia		
XW8—Laos		
XZ2—Burma		
YA—Afghanistan		

	Phone	C.W.
YB, YC, YD, 8F—Indonesia		
YI—Iraq		
YJ—New Hebrides		
YK—Syria		
YN—Nicaragua		
YO—Rumania		
YS—El Salvador		
YU—Yugoslavia		
YV—Venezuela		
YV0—Aves Is.		
ZA—Albania		
ZB2—Gibraltar		
ZD3—The Gambia		
ZD5—Swaziland		
ZD7—St. Helena		
ZD8—Ascension Is.		
ZD9—Tristan da Cunha & Gough Is.		
ZE—Rhodesia		
ZF1—Cayman Is.		
ZK1—Cook Is.		
ZK1—Manahiki Is.		
ZK2—Niue		
ZL—New Zealand		
ZL/A—Auckland and Campbell Is.		
ZL/C—Chatham Is.		
ZL/K—Kermadec Is.		
ZM7—Tokelau		
ZP—Paraguay		
ZS1-6—South Africa		
ZS2—Prince Edward and Marion Is.		
ZS3—South-West Africa		
1M—Minerva Reefs		
1S—Spratly Is.		
3A—Monaco		
3B6, 7, VQ8—Agalega and St. Brandon		
3B8, VQ8—Mauritius		
3B8, VQ8—Rodriguez		
3C, EA0—Equatorial Guinea		
3V8—Tunisia		
3W8, XV8—Vietnam		
3Y—Bouvet Is.		
4S7—Ceylon		
4U1—I.T.U. Hq. Geneva		
4W—Yemen		
4X4, 4Z4—Israel		
5A—Libya		
5B4, ZC4—Cyprus		
5H3—Tanzania		
5N2—Nigeria		
5R8—Malagasy Republic		
5T—Mauritania		
5U7—Niger Republic		
5V—Togo Republic		
5W1—Samoa		
5X5—Uganda		
5Z4—Kenya		
601, 2, 6—Somali Republic		
6W8—Senegal Republic		
6Y5—Jamaica		
7G1—Republic of Guinea		
7O, VS9—South Yemen Republic		
7P8—Lesotho		
7Q7—Malawi		

	Phone	C.W.
7X, FA—Algeria		
8P—Barbados		
8QA, VS9M—Maldives Is.		
8R—Guyana		
8Z4—Saudi Arabia/Iraq Neutral Zone		
9A1, M1—San Marino		
9G1—Ghana		
9H1—Malta		
9J—Zambia		
9K2—Kuwait		
9K3, 8Z5—Kuwait/Saudi Arabia Neutral Zone		
9L1—Sierra Leone		
9M2, 4—Western Malaysia (fr. 16/9/63)		
9M6, 8—Eastern Malaysia (fr. 16/9/63)		
9N1—Nepal		
9Q5—Republic of the Congo		
9U5—Burundi		
9V1, VS1, 9M4—Singapore (prior to 16/9/63 or after 8/8/63 only. From 16/9/63 to 8/8/65 Singapore counts as 9M2—West Malaysia)		
9X5—Rwanda		
9Y4—Trinidad and Tobago		
*—Blenheim Reef		
*—Geyser Reef		

* Since there is no apparent claim by any country to these reefs, no prefix will be shown. Confirmations for contact only after 4/5/87 will be accepted for D.X.C.C. credit.

DELETED COUNTRIES LIST

	Phone	C.W.
C9—Manchuria (prior 16/9/63)		
CN2—Tangier (prior 1/7/60)		
CR8—Damas, Diu (prior 1/1/62)		
CR8—Goa (prior 1/1/62)		
EA9—Ismi (prior 13/5/69)		
ET2—Eritrea (prior 15/11/62)		
FF8—French West Africa (pr. 7/8/60)		
FI8—French Indo China (pr. 21/12/50)		
FN—French India (prior 1/11/54)		
FQ8—French Equ. Africa (pr. 17/8/60)		
II—Trieste (prior 1/4/57)		
IS—Italian Somaliland (prior 1/7/60)		
JZ0—Nether. New Guinea (pr. 1/5/63)		
PK1, 2, 3—Java (prior 1/5/63)		
PK4—Sumatra (prior 1/5/63)		
PK5—Netherlands Borneo (pr. 1/5/63)		
PK6—Celebes & Moluc. Is. (pr. 1/5/63)		
UN1—Karelo-Finnish Rep. (pr. 1/7/60)		
VO—Newfoundland (prior 1/4/49)		
VQ6—Brit. Somaliland (prior 1/7/60)		
VS4—Sarawak (prior 16/9/63)		
VS9H—Kuria Muria Is. (pr. 29/11/67)		
ZC5—Brit. North Borneo (pr. 16/9/63)		
ZC6—Palestine (prior 2/7/68)		
ZD4—Gold Coast, Togo'd (pr. 8/3/57)		
9M2—Malaya (prior 16/9/63)		
9S4—Saar (prior 1/4/57)		
9U5—Ruanda-Urundi (between 1/7/60 and 1/7/62 only)		

AMSAT 1970 ANNUAL REPORT

By DR. PERRY I. KLEIN,* K3JTE, President

On March 3, AMSAT reached its first anniversary incorporation and entered its second year of activity. Membership grew from 264 members and 11 member clubs on January 1, 1970, to over 370 members and 28 member clubs in 24 countries. The following comprises the second annual report presented at the AMSAT annual meeting, held on November 21, 1970.

ACCOMPLISHMENTS TO DATE

AUSTRALIA OSCAR 3

This first full year of AMSAT's operation witnessed the launch of the fifth Radio Amateur satellite of the Oscar series, Australia Oscar 3 (AO-3), built by the WIA Project Australia group in Australia, and launched from the Western Test Range, Calif., on Jan. 23, 1970. The spacecraft's two metre beacon transmitter operated for 23 days and its command and ten metre beacon transmitter reached end of life after 48 days.

The AO-3 mission was technologically significant in several respects. Of particular significance was the command system which was used to control the operation of the ten metre beacon. Commands were successfully transmitted by telemetry from the WIA Project, United States, marking the first time that successful operation of a command system has been demonstrated in a satellite in the Amateur Service.

The passive magnetic attitude stabilization system employed in AO-3 was also successful. The bar magnet and eddy-current damper brought one axis of the spacecraft into alignment with the earth's magnetic field within a week of launch. The radio beacon operation was indicative of the effectiveness of this method of reducing the spin in Amateur satellites.

AO-5 was the first satellite in the Amateur Service to transmit in an HF Amateur band. Many reception reports of the 28.45 MHz ten metre beacon were received from Australia and S.W.'s using simple long-wire or dipole antennas. Reports of skip propagation and auroral propagation were reported by a number of observers.

Reports were received from several hundred stations in at least 27 countries, including the Soviet Union. All telemetry reports were forwarded to WIA Project Australia in Melbourne for processing and R.G.T. acknowledgment. Reports from I.A.R.U. Region 1 and Region 2 were collected and handled by Bill Browning, G2AOX, Region 1, Oscar Co-ordinator.

The results of the AO-6 project are contained in the "AO-5 Summary Report" submitted June 9 to the FCC and NASA, and reprinted in the issue 170 issue of the "AMSAT Newsletter". Two other reports, one detailing the propagation results and the other dealing with the spacecraft and of AO-5's, were also submitted to FCC and NASA, and appear in the October and December 1970 issues of "QST," respectively.

ATS-6 EXPERIMENTAL PROPOSAL

In November 1969, AMSAT submitted a proposal to NASA to provide two Amateur experimental stations for the ATS-6 Technology Satellite G (ATS-6G) synchronous satellite. This 13-page formal document proposed an orbital experiment and of ATS-6's synchronous ("stationary") orbit.

At NASA's request, an addendum to the proposal was prepared and submitted on July 7, 1970, dealing with the choice of frequency bands proposed and the question of the possibility of interference to and from other stations in the Amateur Service. In its invitation, AMSAT gave an oral presentation of the proposal before a NASA advisory committee evaluating the ATS-6 experiments.

WORLD ADMINISTRATIVE RADIO CONFERENCE PREPARATIONS

In preparing for the June 1971 World Administrative Radio Conference, the Space Stations which will be dealing with the allocation of frequencies for Amateur satellites, AMSAT

prepared two documents for the ITU's International Telecommunications Committee (CCIR). One is a report entitled "Technical Feasibility of Frequency Sharing in the Amateur Radio Service when using Space Communications Techniques," and the other is a recommendation on the same subject. Both documents were approved by the U.S. CCIR National Committee for forwarding to the other ITU member countries. AMSAT also assisted the ARRL in preparing material to the FCC on frequency requirements for future Amateur satellites. The text of one filing to the Commission is reprinted in the August issue of "QST".

AMSAT ADDRESSES AND PRESENTATIONS

In conjunction with the 1970 ARRL National Convention held in Boston, Sept. 25-27, AMSAT sponsored the first Radio Amateur Satellite Conference, with sessions presenting the results of AO-3 and plans for future projects. Addresses were given at several other Amateur gatherings, including the Dayton Hamvention, the Keosauke Division Convention, the Syracuse Townview and Central States Society conventions, and a number of radio club meetings. An AMSAT paper entitled "Radio Amateur Satellite for Education and Research" was presented at the 1970 IEEE Electronics and Aerospace Systems Conference held in Washington in October.

CURRENT ACTIVITY—AMSAT-OSCAR B

Work is proceeding on AMSAT-Oscar B (AO-3), the first of a series of long lifetime Amateur communications satellites designed for launch as secondary payloads on Thor-Delta or Agena missions. A detailed specifications document on this series of spacecraft was prepared in April and distributed as guidance for proposals for payloads. A brief for AO-3 is in developing experiments for these satellites. There are now several experiments under development.

A four-channel, channelized, hard-limiting FM repeater is being breadboarded by members of the WIA Project Australia and being involved in the construction of Australia Oscar 3. The repeater is of the demodulation-remodulation type and employs a frequency approximating 144 MHz for use with the 43.1 MHz. for the downlink, with a satellite transmitter power output of one watt per channel.

A linear repeater with a bandwidth of 80 KHz. is under construction by the Euro-Oscar group in Marbach, West Germany. This repeater has an input frequency of 43.1 MHz. and an output frequency of 143.9 MHz., with a satellite transmitter power output of ten watts. The repeater is designed for use with SSB CW, AM FM RTTY or SSTV, with as many stations as can fit within its 80 KHz. passband.

Also being breadboarded is a linear repeater under construction by AMSAT members in the United States. This repeater has an input frequency of 144 MHz. and an output frequency around 28.5 MHz., with a satellite transmitter power output of two watts. This repeater is designed for use with any method of modulation permitted in these two bands.

The WIA Project Australia group has developed an Oscar telemetry encoder which transmits telemetered satellite parameters directly in 850 Hz. audio frequency-shift keyed (FSK) format. It is designed for use with 80 w.p.m. teleprinter. Any station having a tape recorder will be able to send or receive the recorded data directly to AMSAT headquarters for computer processing, or they may decode the telemetry data themselves using calibration information which will be made available to the public.

John Good, W3CAY, has designed and breadboarded an Oscar telemetry encoder which transmits satellite parameters directly as numbers in Morse Code, so that only pencil, paper and calibration information are needed for reception and interpretation of data from the satellite.

A breadboard of a command encoder capable of providing up to 35 separate command functions is under construction by the WIA Project Australia group. The command encoder is designed to provide a reliable and secure means of controlling the operation of the satellites to minimize any possibility of interference.

Several panels of solar cells left over from NASA and ESSA satellite programmes have been made available for use in the AO-3 series of satellites. Several of these panels are being reconfigured for use in AO-3. Rechargeable nickel cadmium batteries have also been made available and have been undergoing charge/discharge cycle testing under simulated satellite power loads. The solar cells and rechargeable batteries are expected to make possible satellite operating lifetimes in excess of one year.

Following designs prepared by AMSAT's AO-3 Project Manager, Jan King, W3GVE, the AO-3 internal structural assembly and experiment modules have been fabricated at the facilities of W3QBT in Ithaca, New York. This is actual flight hardware, and represents the beginning of construction of the AO-3 spacecraft.

An AMSAT proposal to NASA for the launch of AMSAT-Oscar-B was submitted in August and an oral presentation was given in November. Much of the AO-3 description and justification material included in the proposal was reprinted in the Sept. issue of the "AMSAT Newsletter".

In connection with the AO-3 satellite proposal, a third-party agreement has been arranged between Australia and the United States to permit the exchange of third-party Amateur satellite data. This arrangement extends the previous AO-3 third-party agreement arranged last year until several months after the end of life of Oscar 3.

FUTURE ACTIVITY

AMSAT is giving highest priority to the development of long-lifetime, solar-powered Oscar satellites that can be used regularly and extensively for educational and research purposes, particularly on the VHF Amateur bands. Thus it is planned that the satellites to come, beginning with AO-3, will open the door to the international use of Amateur satellites as an additional mode of communications for Amateur Radio.

☆

CHANGE IN INTRUDER WATCH CO-ORDINATOR IN N.S.W.

Bill Jenvey, VK2ZO, has been appointed Intruder Watch Co-ordinator for New South Wales in place of Ross Treloar, who has been forced to retire due to overseas work commitments.

Bill Jenvey's (VK2ZO) address is 6 Forsyth Street, Willoughby, N.S.W., 2068.

A & R-SOANAR 25th ANNIVERSARY

Now one of Australia's leading components and equipment manufacturers and distributors, the A & R-Soanar Group of Companies are currently celebrating 25 years in business.

During the last five years, A & R diversified their manufacturing activities by developing a range of electronic and electrical equipment, specializing in power supplies for communications, educational and laboratory apparatus, and consumer electronic products.

A variety of air-cooled transformers from sub-miniature to 10kva. have been developed as well.

The scope of activity by the Group runs into many millions of dollars a year, with offices in three States, employing approximately 1000 people. The range of products includes designing of equipment, transformers and components; with the consolidation of offices and the new Soanar Group now embrace over 25,000 square feet of space.

A continual research and development programme involving two groups, transformers and equipment, are all part of overall plans for further expansion to keep pace with industry and to meet future requirements from manufacturing, consumer and government departments.

By early 1971, a Tokyo office will be established to handle the purchase of Japanese Electronics and to provide improved availability of capacitors, resistors and other components.

The A & R-Soanar Group, with 25 years' operational success behind them, look forward to the next 25 years with excitement and optimism. The part of Australia's fastest growing industry.

* P.O. Box 27, Washington, D.C., 20064, U.S.A.

THE CALL BOOK

The 1971 issue of the Call Book is now in the course of preparation. The schedule we are working to means that the book will be available some time during April, and will include all alterations and additions as notified to us by the P.M.G.'s Department up to and including the December 1970 lists.

In previous years, we have received some severe criticism over errors that have appeared in the Call Book, but our experience has shown that the errors which have occurred have been due to the fact that many licensees have failed to notify the Department when there has been a change of address, despite the fact that any such change of station location can (according to the regulations) only be made with the permission of the Department. The fact that this regulation is not strictly enforced in no way relieves the licensee of his responsibility of making sure that his address is correctly advised to the proper authorities.

In an endeavour to produce the most up-to-date Call Book possible, we will notify the Department of any changes of address of which we are aware, but have not appeared in any official Departmental lists up to December 1970.

— . . . —

LICENSED AMATEURS IN VK AT AUGUST 1970

	Full	Limited	Total
VK0	7	0	7
VK1	83	28	111
VK2	1401	457	1858
VK3	1294	635	1929
VK4	527	194	721
VK5	516	233	749
VK6	356	140	496
VK7	160	72	232
VK8	31	10	41
VK9	64	8	72
	4459	1777	6236
			Grand Total

Results of 432 MHz. Aerial Gain Contest

(continued from page 10)

COLINEAR DESIGN

The two antennas exhibiting highest gain (15 and 16 dB. respectively) were 32 element extended-expanded collinear. These antennas originated in the San Francisco Bay area of California and have become increasingly popular in the United States. The lengths of the driven elements are extended to 5/8 of a wavelength and the spacing between parallel elements expanded to 3/4 of a wavelength. In conventional collinear these dimensions are both 1/2 wavelength. The detailed dimensions are given in Fig. 2.

YAGI DESIGN

The most successful yagi (11 dB.) was based on the highly reputed VK3ABP design, the dimensions of which are given in Fig. 3.

CONCLUSION

It is expected that the antenna gain measurement will become an annual event, thus providing Amateurs in the Eastern States with a means of evaluating their antennas and determining trends in antenna design.



Brian Armstrong G3EDD, Executive Vice-President of R.S.G.B. recently visited Melbourne. Leo Jenkins, VK3ZBJ, Project Manager of W.I.A. Project Australia Group, is showing Brian a 432 MHz. transceiver. On the left is W.I.A. Federal President Michael Owen, VK3KJ.

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W.I.A. D.X.C.C.

Listed below are the highest twelve members in each section. Position in the list is determined by the first number shown. The first number represents the participant's total countries less any credits given for deleted countries. The second number shown represents the total D.X.C.C. credits given, including deleted countries. Where totals are the same, listings will be alphabetical by call sign.

Credits for new members and those whose totals have been amended are also shown.

PHONE

VK3MS	318/343	VK3AB	297/314
VK3RU	317/343	VK4FJ	287/307
VK4HR	315/338	VK4TY	286/286
VK3AO	311/338	VK3APK	281/281
VK3MK	304/324	VK3AAK	272/277
VK4KS	300/315	VK3TL	271/271

VK4PX	251/282	VK3W	224/225
VK3AMK	227/237	VK4RF	192/193

Correction:
VK3AMK shown in the Nov. 1970 list as Cert. No. 313, should read Cert. No. 314.

C.W.

VK3QL	305/330	VK3YL	279/296
VK3AQH	301/315	VK3NC	274/289
VK4FJ	290/315	VK3CB	270/287
VK4HR	288/311	VK3ARX	270/278
VK3AGH	282/286	VK3RU	266/289
VK3APK	280/288	VK4TY	259/272

VK4RF	180/181	VK4PX	107/111
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OPEN

VK3RU	318/343	VK3MK	304/324
VK4HR	318/343	VK3EO	302/325
VK3AGH	314/324	VK4KS	301/325
VK3VH	310/328	VK3APK	298/308
VK4SD	306/321	VK4FJ	288/323
VK4TY	308/321	VK3ARX	297/300

VK4PX	285/299	VK6HD	191/191
VK4RF	235/247		

Call No.	Call	Total
130	VK3JK	138/139

NEW CALL SIGNS

AUGUST 1970

VK1DA—A. Davis, 49 Duigan St., Seulin, 2814.
VK1GY—E. Smith, 23 Gluyas St., Farrer, 2807.
VK1JX—H. L. Daniell, 4 Bandjalong Cres., Aranda, 2800.
VK1LW—L. M. Stone, Lot 10, Trafalgar Rd., Turrea Heads, 2537.
VK2WV—E. V. Rawson, 33 Essila St., Colaroy Plateau, 2066.
VK2ADX—S. A. Mann, 9 Birubi Ave., Pymble, 2073.
VK2AHK—G. B. Moss, 18 Montreal Ave., Kurlara, 2071.
VK2ALK—B. W. Smeaton, 81 Carina Rd., Oyster Bay, 2028.
VK2APX—G. H. Dennis, 21 Leichhardt St., Leichhardt, 2048.
VK2ATC—T. R. Iwasenko, 3 Rosedale St., Canley Heights, 2188.
VK2ATR—P. R. Lorentzen, 21 Pennell St., Sackville Park, 2283.
VK2AV—J. R. Witter, 558 Buchhorn St., Lavington, 2841.
VK2AVS—R. J. Irving, 7 Lens Pl., Merrylands, 2145.
VK2BAH—D. G. Hoskins, 24 Lucinda Ave., Wahroonga, 2078.
VK2BBI—R. A. Day, 37 Rancula St., Booracina, 2254.
VK2BL—L. K. Kineh, 6/12-18 Morwick St., Strathfield, 2135.
VK2BLS—M. Smith, 11 Clarice St., Lithgow, 2792.
VK2BNI—P. T. Nicholson, 89 Copeland Rd., Beecroft, 2119.
VK2BRH—J. H. Walton, Wentworth Hotel, Sydney, 2000.
VK2IX—G. D. Wilson, 23 Swift St., Port Macquarie, 2444.
VK2KW—W. A. Wallis, 54 Combined St., Wingham, 2439.
VK2LZ—L. A. Davies, 90 Cambridge St., Stanmore, 2046.
VK2ZJ—D. W. Friend "Weidon," Old Northern Rd., Durral, 2188.
VK3ANA—P. W. Cole, 135 Mackie Rd., East Benleigh, 3168.
VK3AWC—A. J. Electronics Radio Club, 310-324 Ferntree Gully Rd., Clayton North, 3168.
VK3BEC—E. Cabana, 2 Stirling St., Kew, 3101.
VK3BRT—Box Hill Boys' Technical School Radio Club, Box Hill Boys' Technical School, Dunlavin Ave., Box Hill, 3186.
VK3BSJ—St. John College Radio Club, 204 Churchill Ave., Braybrook, 3018.
VK3YAX—D. E. Burgess, 43 Canberra St., Moa, 3823.
VK3YBZ—A. J. Cartwright, 38 Rose St., Highett, 3180.
VK3YBN—E. Hynds, 11/74 Auburn Rd., Hawthorn, 3182.

VK4BC—C. W. Bennetts, 251 East St., Rockhampton, 4700.
VK4M3—W. C. Mitchell, Station Cr. Coe's Creek Rd. and Glenys St., Nambour, 4560, Postal: P.O. Box 206, Nambour, 4560.
VK4RP—W. D. Macaulay, 25 Parkmore St., Bundoab, 4054.
VK5AJ—A. P. Jordan, 94 Allings Ave., Glenunga, 5061.
VK5AT—R. A. Coutens, 17/3 Phillips Hwy., Elizabeth, 5112.
VK5JJ—J. J. Fischback, 15 Brinsalov Ave., Seacomb Gardens, 5047.
VK5JT—J. Kilgiver, Station, 15 Palawalooa, Fontaine, 5112, Glenelg, 5045, Postal: Mosley St., Glenelg, 5045.
VK5OY—C. F. Ford, Station, Stanbury Rd., Minlaton, 3575, Postal: P.O. Box 60, Minlaton, 3575.
VK5QN—P. Clark, Station, Portlaur: Postal: C/o Supt. Radio Branch, Adelaide, 5000.
VK5QP—J. T. O'Donnell, 11 Parkhouse Ave., Seaton, 5023.
VK5XC—E. E. Leist, Station, Portlaur: Postal: C/o Supt. Radio Branch, Adelaide, 5000.
VK5YD—W. R. Ogden, Station, Portlaur: Postal: C/o Supt. Radio Branch, Adelaide, 5000.
VK5ZAA—J. D. Bishop, 11 Auburn Ave., Myrtle Bank, 5004.
VK6ZFP—P. Philbrook, 39 Secombe St., Elizabeth Grove, 5113.
VK6HI—E. A. Hayward, 121 Hopkins St., Boulder, 9422.
VK6LD—P. H. Long, 15 Camberwell Rd., Balga, 6051.
VK6KK—B. A. Wheeler, R.F.D.S. Base, Meekatharra, 6048.
VK6ZS—W. Smith, 183 Fraser St., Geraldton, 6330.
VK6AW—Wireless Institute of Aust. (W.I.A.), Div. 1, Station, Portlaur: Postal: G.P.O. Box 1002, Perth, 6001.
VK6CF—P. B. Dodd, Station, Portlaur: Postal: C/o Supt. Radio Branch, Adelaide, 5000.
VK6ZCB—C. B. Howard, C/o. Coogee Caravan Park, Coogee Beach, 6164.
VK7JZ—J. S. Zinna, 19 Miller Cyn., Alice Springs, 2174.
VK8KP—C. K. Perry, 68 Nicker St., Alice Springs, 2176.
VK8AU—S. A. Sibby, Station: D.C.A. Res., 324 Springarden Rd., Konedobu, P; Postal: P.O. Box 207, Konedobu, P.
VK8YR—R. C. McPhee, Coos Keeling Island.
VK9JM—J. A. Carr, Davis Base.
VK9TM—A. Morgan, Macquarie Island.

CANCELLATIONS

VK1ZRN—R. W. Nash, Not renewed.
VK2ZS—R. R. Iwasenko, Now VK2ATC/T.
VK3EA—E. Anderson, Deceased.
VK3AAV—N. W. Deague, Transferred to N.S.W.
VK3ADD—H. L. Daniell, Now VK1JX.

VK3AGB—A. G. Bolton, Transferred to S.A.
VK3AUT—S. A. Sibby, Now VK8AU.
VK3CY—D. J. Bannister, Incorrectly advised, VK3BID March Supplement.
VK3ZPT—F. H. Birkbeck, Not renewed.
VK3ZU—A. K. Hore, Not renewed.
VK4Y—W. D. Macaulay, Now VK4RP.
VK4KN—G. J. Cohen, Transferred to N.S.W.
VK4NI—A. H. Nicholls, Not renewed.
VK4YS—R. A. Sedgeman, Transferred to S.A.
VK4ZB—C. W. Bennetts, Now VK4BC.
VK5GW—F. G. Wallace, Not renewed.
VK5KQ—N. T. Park, Not renewed.
VK5TN—G. G. Tideman, Not renewed.
VK5ZC—C. A. Appleby, Not renewed.
VK5ZXD—J. J. Fischback, Now VK5JJ.
VK6LU—L. Stagg, Deceased.
VK6TM—W. E. Muhlenstein, Deceased.
VK6UT—C. E. Miller, Jnr, Returned to U.S.A.
VK6XI—R. Hannaford, Transferred to S.A.
VK6KY—K. Y. Young, Transferred to N.S.W.
VK6AB—E. R. Metzger, Not renewed.
VK6M—J. Muller, Not renewed.
VK6GR—G. Rankin, Radio Club, Not renewed.
VK6NT—N. T. Casey, Not renewed.
VK6ZDW—D. Weston, Not renewed.



COOK BI-CENTENARY AWARD

The following additional stations have qualified for the Award:

Cert. No.	Call	Cert. No.	Call	Cert. No.	Call
587	WASTGU	918	W8ORT	944	ZM1ACL
588	ZAFJF	919	F7JAF	945	Z1BHO
589	ZM1CK	920	JASITTT	946	Z1BHO
590	AX2BA	921	WABUQT	947	ZM1AL
591	KL7GP	922	WAXYKA	948	K8TAS
592	AX2GB	923	ZM1AYQ	949	OX2HME
593	ZM1NK	924	G7TJV	950	BFD01
594	OE8RI	925	G7TJV	951	ZM1IB
595	AX2BA	926	AX2YV	952	AX2YV
596	Z1BBD	927	D1BDA	953	AX3AXK
597	ZM1BEV	928	OE8WR	954	ZM1K
598	AX2BA	929	DK3SS	955	AX3HIN
599	AX2BBA	930	DK3SS	956	AX3HIN
600	G8CP	931	AX3BNL	957	JAE8JO
601	ZM2BZF	932	W8OCW	958	SMD8DU
602	W8GJZ	933	W8GJZ	959	AX3BEG
603	W8GJZ	934	W8GJZ	960	W8GJZ
604	AX3BM	935	W8AKE	961	VE8H
605	PE8PM	936	PE8PM	962	W8OAR
606	W8GJZ	937	W8GJZ	963	OX8U
607	DK1KO	938	W8ELG	964	JAE8AU
608	KL7GQD	939	G8MZV	965	G8U
609	W8YD	940	W8YD	966	ZM1PZ
610	G8MCFB	941	W8HIN	967	W8B10
611	JD8VY	942	VE8ANS	968	IANE
612	W8YD	943	W8YD	969	AX3AWN
613	AX3BD	944	W8IDM	970	DFHAC
614	AX3HGA	945	AX3FC	971	DFHAC
615	G8WYF	946	W8AES	972	AX3AJL

Correction: Certificate No. 887 shown on the previous list as W8YOR should read Cert. No. 887 WASTGU.

V.F.F./U.N.F. SECTION

The following additional stations have qualified for the Award:

Cert. No. 5—AX3ZQN
Cert. No. 6—AX3ZIF



CANBERRA EASTER CONVENTION

The popular Easter Convention which for many years in the past has been conducted by the Canberra Radio Society (an affiliate of the W.I.A.) is to be resumed after a spell of three years.

The 1971 Easter Convention will be staged at Canberra City on April 3, 10, and 11, as well as the many usual attractions that Canberra offers, a strong convention committee is arranging a superb week end of Amateur Radio and social activity, with an emphasis on family participation.

Special attractions will include a barbecue luncheon on Springbank Island, a two-hour cruise on Lake Burley Griffin aboard a modern ferry chartered for you by the Canberra Amateurs, and conducted coach tours for wives and children. While father is engaged in competitive Amateur Radio events. These attractions, plus swimming and trout fishing, will be at no extra cost.

A comprehensive programme is now being prepared and will be sent to you on receipt of your enquiry—either by post or through any member of the Canberra Radio Society. Accommodation will be limited, please book early to avoid disappointment.

WIRELESS INSTITUTE OF AUSTRALIA-FEDERAL EXECUTIVE AMATEUR JOURNALS

The Institute can now offer annual subscriptions to following Amateur Journals:

- ★ "QST"—Associate membership and renewals, \$6.40.
- ★ R.S.G.B. "Radio Communication" (ex "The Bulletin") is only sent with membership of Society, \$8.80. Send for application form.
- ★ "CQ" Magazine, \$5.70; Three Years, \$13.50.
- ★ "73" Magazine, \$5.50; Three Years, \$11.50.
- ★ "Ham Radio" Magazine, \$5.50; Three Years, \$11.50.
- ★ N.Z.A.R.T. "Break-In", \$2.35.

R.S.G.B., A.R.R.L., "CQ" and "73" Publications also available at special prices. 1970 N.Z. Call Book, 75 cents, plus 6 cents postage

Send remittance to F.E. Publications Dept., C/o. P.O. Box 67, East Melbourne, Vic., 3002

Receipt of your first issue will serve as acknowledgment of your sub. Allow six weeks for delivery.

SO YOU HAVE CHANGED YOUR QTH

For as long back as we can remember, the first page of this magazine has shown details for the procedure to be adopted to correctly ensure that your copy of "A.R." will reach you after a change of address. However, it is becoming more and more apparent that the procedure is not being followed as it should be, many members trying to short-circuit the system by notifying us direct.

Instead of helping, this procedure only delays the change in our records, as we have to refer these changes back to the Division concerned. We now make a plea that the procedure that has been laid down be followed, namely when you have a change of address, notify your Divisional Secretary—NOT US. Your Secretary will include the change in his monthly list to us. He knows when and where to send it.

You can help yourself by making sure to advise your Secretary in plenty of time, and not two or three months

later. The number of copies of "A.R." which are returned to us each month with the endorsement "not known at this address," or similar, is reaching quite a large figure. This is involving us in much extra work and expense, as we have to locate the member concerned and re-post the magazine. We have no way of knowing how many "A.R.s" are delivered although wrongly addressed. May we suggest you check the wrapper from this issue, and if there is any error, notify your Secretary immediately.



AWARDS FOR TECHNICAL ARTICLES

The Publications Committee considered the allocation of these awards at the December meeting, and as a result, awards have been made to Mr. R. H. Black, VK2QZ, Mr. R. F. Dannecker, VK4ZND. The various articles covering "Australis" were also voted into an award, but in view of the number of people involved it was considered im-

practical to try to make a worthwhile award to each and every individual worker on the project. It was, therefore, decided to make the award to the Project Australis Fund

Our congratulations to the recipients. To the other contributors who just failed to make the grade this year, our thanks, and we hope you will try again.

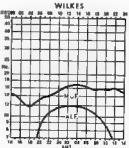
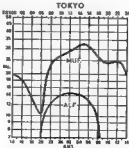
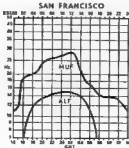
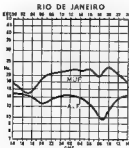
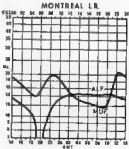
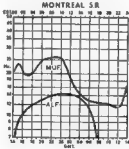
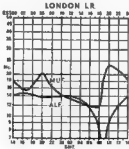
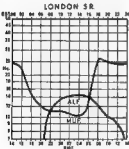
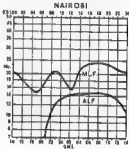
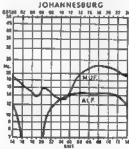
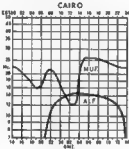
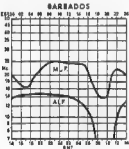


HIGGINBOTHAM AWARD

This year a somewhat unusual result came from the voting for this award. Two previous winners were well up in the voting, and one man almost made it for the third time. The final outcome was to make the award to the VK3 V.h.f. Group in recognition of the large amount of work they have devoted to their projects over the last two years. Once again, the number of individuals concerned was too many to allow awards to each and everyone, hence the award has been made to the Group as a whole, for them to apply as they wish.

PREDICTION CHARTS FOR JANUARY 1971

(Prediction Charts by courtesy of Ionospheric Prediction Service)





Sub-Editor: ERIC JAMIESON, VKSL
 Forrester, South Australia, 5253.

Closing date for copy 30th of month.
 All Times in E.S.T.

AMATEUR BAND BEACONS

- VK4 144.390 VK4VU, 107m. W. of Brisbane.
- VK3 153.850 VK3V, Mt. Liff
- VK6 52.005 VK6VF, Turst Hill
- 52.850 VK6ST, Carnarvon
- 144.500 VK6VF, Mt. Barker
- 145.000 VK6VF, Turst Hill
- 435.000 VK6VF (on by arrangement).
- VK7 144.800 VK7VF, Devonport.
- VK3 148.000 VK3XL, Christchurch, Island.
- ZL3 148.000 ZL3VHF, Christchurch.
- JA 51.800 JA3JF, Japan
- W 50.001 W8KAP, U.S.A.
- HL 80.100 HL8WI, South Korea.

As of this writing, 6 metres is beginning to warm up in readiness for the DX season. Probably the most important news this month was contained in a message from Bill VK3ZBU who reports that the W. land beacon W8KAP (see list above) at strength up to 2 S 9 on 6th November between 1300 and 1400. Everything possible was done to try and get a signal back the other way, but, frustratingly, no results. No further details of the station are available, and therefore it is not known whether anyone monitors the station during key up periods. JA's were also heard in Sydney at the same time. Around the same time, rumour went around VK3 that Eddie VK1HP had worked HL8WI, but since then advice has come through that the station was heard but not worked.

A number of minor 6 metre openings to various States have been noted during November. Strong signals were received from a few VK's in S.A. (also Vic.—Ed.) on Sunday, 29th November. John VK4ZJBR, operating from a high peak, worked VK3 at strength up to 2 S 9 and using his much advertised 10 element yagi, certainly put a rock-crushing signal into this section. During the month, a number of openings during peak 6 metre openings, Channel B F.M. on 148 MHz, will be receiving plenty of attention in VK4, so operators throughout the land should be able to hear the 108 MHz signal on frequency, particularly as Channe B is now being used in a big way in Queensland. John VK4ZJBR reports that he worked the Sydney a few weeks ago on Channe B, so the distance is being lengthened considerably. JA's have been scarce in Brisbane for the past few weeks, however, not withstanding, John has now worked more than 500 of them, with 110 confirmations. Not a bad effort!

Last month details were given of operating schedules of Bob VK3AOT, and they are re-mind-ed to read the information again. Bob will be operational on 53, 144, 432, 578 and 1230 MHz from Mt. Cowley, 80 miles south-west of Melbourne, from 18/17/79 to 11/1/79. If you want a telephone contact during that time, contact Eric Gray, VK3ZSB on (03) 25-3249 (home) or 831 630-8613 (business). Bob will be looking for feeds on 53 MHz, 144 MHz, 432 MHz, 578 and 1230 MHz, and on 6 metres between 24th and 30th December with a view to establishing contacts in sporadic E with VK2, 4 and 8 on 2 metres.

There appears to be quite an upsurge in portable and general DX activity this season from the VK8 Vhf News Bulletin comes the following information. Operation is planned by VK8 SWA, 8200 ft, working from the A.B.N.Y. region on 53 MHz, a.s.b., 53.525 Mhz, 53.528 Mhz, 144 a.s.b., 146 mhz, also the possibility of 432 MHz and 1230 MHz. An attempt will be made to work Bob VK3ZVF from there. Bob VK3ZVF is planning operation from either Esperance or Hopetoun on 3rd and 4th January, using a 6 element 8 metre s.m. Percy VK8DD will be operating from Augusta on 53 MHz, a.m., 53.550 Mhz and 148 MHz, f.m. from about 20th December for three weeks, in addition to activity of h.f. bands 80 to 10 metres.

There seems to be no definite portable plans from VK5 during the DX season, other than reports that Wally VK6ZWW and John VK5QZ will be operating (from Cowell, and Yvern, S.A.). Of interest to VK8 operators will be Kerry VK5VU at Ceduna, who is a bit more

than half way between Perth and Adelaide. He is probably now operational on both 6 and 2 metres, so bear this in mind in VK8.

The only letter received this month is from Bob VK3AOT (bless him!) He never let's me down!). Amongst other matters which have already been included at odd points above, reports Norm VK3ZAT will be operating from Mt. Maticook, 90 miles north-east of Melbourne from 1st to 3rd January, using a.m. on 53, 144 and 432 MHz, 1230 Mhz, also 1230 Mhz. Day on 2nd January between 1100 and 1800.

In general, it looks as though the DX season, providing conditions are right, could be a real winner this year, the amount of interest being shown is quite exceptional, and with more and more stations getting their equipment in a condition suitable for portable operation, some very interesting contacts could be forthcoming. It is to be hoped various portable and other operators will drop me a line and tell me all about it.

And if you are not completely satisfied with all the above proposed operating, you may be interested to know there is to be a balloon test out from Mildura some time in February regarding transmitting equipment. Input power 100 MHz, f.m., output on 432.17 MHz, f.m. Power output is about 2 watts. The launch is an experiment as part of the Australia project.

A further news item from Bob VK3AOT mentions he has received a report from Ray VK3IATN with a preliminary announcement to the effect that some time next year he will have his dish antenna and a very large 2 metre antenna available to any interested Group for moon-bounce experiments. Provided any group brings it's own gear, Ray does not mind if those concerned use what they wish. That's a kind offer Ray, further details will be published later, in the mean time, those likely to be interested might care to contact Ray direct and find out what is needed.

Keep an ear on 31.57 MHz, each night in Leigh VK9SW beams east at 2000 hours and is looking for contacts. The path to VK3 was open from VK8 on 24th November between 1800 and 1700, so keep those antennas turned. Finally, on this round up of the DX scene, bear in mind the portable operations being undertaken by the South-East Radio Group from "The Bluff", 14 miles north-west of Jct. Gambier; they will be operating the club station VK3SR over the New Year holiday weekend and using all bands from 80 metres through to 1230 MHz.

From "Break-In" of N.Z.A.R.T. comes the following paragraph and I quote: "Big Sam" says. Again, from a contact with one of the KP4's at Aorangi, Dan AALD says he's the latest activities of Sam Harris, KP4BPZ. Maybe Sam lets the grass grow under his 100 foot dish, but he certainly doesn't let it grow under his feet. He has just bought 28 acres in the area near the 1,000-ft. radio telescope and is to make some improvements." He's going to build a 300-foot dish! Not only will this improve his already devastating signal from the moon, but it will give him a greatly improved sky wave beacon. I can only wish this were so. It seemed to think that Sam will now be able to acquire stations as far north as Australia and New Zealand. I certainly hope so."

MEET THE OTHER MAN

This month we take a look at the activities of the "Other Man", VK8MTX, who lives at Birchip, Victoria, at an elevation of 230 feet, and 200 miles north-west of Melbourne. Ray will probably be best remembered by many for his moon-bounce efforts, particularly with K3HWA/2 in New Jersey, U.S.A., 13,417 miles. For his efforts in this direction he was awarded C.E.R.L. Technician 1st Class, 1967, and is the only non-American to win it.

First licensed in 1950, Ray is operational on all bands a.s.b. 1.8 MHz. to 30 MHz, and v.h.f. bands 54, 144 and 432 MHz. He runs 120 watts a.s.b. on 53 MHz, using QRP/40 in a final to a 9 element wide spread yagi or two stacked rhombics 300 feet per leg and 75 feet high. (Quite a choice—SLP. The 9 element yagi is 100 feet high. Costs more than a 5CV front end. On 144 MHz, Ray runs 400 watts p.e.p. of a.s.b. to a 4CX350B in a 50 ohm element array at 110 feet, the converter having a 8CW4 front end. On 432, he is currently running 180 watts of a.s.b. (a.s.b. to follow), using a 4CX150A to a 54 element extended-expanded array 125 feet high, solid state converter. The tunable 1:1 for all converters is a Collins T5A4.

With this array of equipment Ray has worked on 53 MHz, VK1, 2, 3, 4, 5, 6, 8, 9, 7, 8, 9; 12, 3, and 4; ZK1, and all JA districts. On 144 MHz, he has worked VK1, 2, 3, 4, 5, 6, 7, and by scatter to ZL4ZS, and most making it to VK8, VK9. By moon-bounce and using stacked rhombic antennas he has worked W1, W2 and W3. On 432 MHz, contacts have been made with VK3, 5 and 7, and adds a comment "no activity in VK37?" His plans for the future include completion of a 32-foot fully steerable dish for E.M.A. on 1500 MHz, and local work on 1090 and 432. He has a partially completed 50-foot dish which will employ feed steering with semi-durable loading wire. However, his work has been retarded considerably by the loss of a very good serviceman recently due to family illness, and until another is found some of his projects will have to be delayed. His antenna farm at present is spread over about 8 acres with 100-foot towers dotted everywhere. Some years ago when I was there I was certainly impressed with the set up, and particularly of the 180 metres vertical, which was mounted on 181 feet high and which was constructed by Ray and hoisted up into position in ONE piece. Quite an imposing structure.

To conclude these notes this time, mention should be made that Wally VK6ZWW and Dave VK3AOT have been conducting moon scatter experiments on 52.010 MHz. Their efforts were rewarded on 14th November at 1000 hours by a 101 feet high and which was from David. No wonder Wally was bawling almost incoherently for several days after so much excitement! Good work chaps. (That's included because I have been invited to Wally's birthday party on 1st January—SLP.)

Thought for the month: "Things tend to even up. The more badly weight you carry around, the shorter time you'll likely have to carry it." So, after next year, hope you are having plenty of DX and may have a prosperous and bountiful year for you. To, Eric VK8LP. The Voice in the Hills.

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Cheques, etc., to W.I.A., P.O. Box 67, East Melbourne, Vic., 3002

Many Maps have been sold and we would like to thank all those people who have made donations over and above the price of the Map

B.A.R.T.G. SPRING RTTY CONTEST

The committee of B.A.R.T.G. wish to thank your readers for their past support of these annual events which are organized in order to promote interest in the RTTY mode as used by Radio Amateurs and also hope that the Group will continue to enjoy the continued participation of readers in any future RTTY Contests that the Group may organize. The contest managers look forward to receiving reader's logs or comments in connection with future RTTY Contests.

RULES

When: 0200 GMT, Saturday, March 13, until 0200 GMT, Monday, March 16, 1971.

The total contest period is 48 hours, but not more than 36 hours of operation is permitted. Times spent in listening periods count as operating time. The 12-hour non-operating period can be taken at any time during the Contest, but off-periods may not be less than two hours at a time. Times on and off the air must be summarised on the log and score sheets. The Contest is also open to SWL RTTY operators.

Bands: 3.5, 7, 14, 21 and 26 MHz. Amateur bands.

Stations may not be contacted more than once on any one band, but additional contacts may be made with the same station if a different band is used.

Country Status: ARRL Countries List, except K1, K2 and VO to be considered as separate countries.

Messages exchanged will consist of:

- Time GMT.
- Message number and RST.

Points.

- All two-way RTTY contacts with stations within one's own country will earn TWO points.
- All two-way RTTY contacts with stations outside one's own country will earn TEN points.
- All stations will receive a bonus of 200 points for each country worked including their own. Note: Any one country may be counted again if worked on another band, but continents are counted once only.

Scoring.

- Two-way exchange points times total countries worked.
- Total country points times number of continents worked.
- Add (a) and (b) together to obtain your final score.

Sample score.

Exchange points (3020) x countries (10) 30200
Country points (8500) x continents (18) 153000
Total 183200

Logs and Score Sheets: Use one log for each band and indicate any rest periods. Logs to contain: Band, Time GMT, Message and RST Numbers sent and received and Exchange Points Claimed. All logs must be received by 31st May, 1971, to qualify.

Awards: Certificates will be awarded to the leading RTTY stations and SWL's. The final positions in the Results Table will be valid for entry in the "World Champion of RTTY" Championship.

The judges' decision will be final and no correspondence can be entered into in respect of incorrect or late entries.

Send your Contest logs to:

Dr. Douglas G. CROFT
B.A.R.T.G. Contest Manager,
18 Linden Gardens, Enfield,
Middlesex, England.



OPERATION FROM TWO N.Z. COUNTIES

The Gisborne Branch of the N.Z.A.R.T. has decided to operate radio stations in conjunction with no permanent Amateur activities. The two counties are Waikato and Waikupo.

Following is a schedule of bands and operating times.

Saturday, 6th February, 1971:

80 Metres: 1500s to 2400s
20 Metres: 1800s to 2400s
15 Metres: 1400s to 1600s

Sunday, 7th February, 1971:

80 Metres: 0700s to 1000s
20 Metres: 1800s to 1700s
15 Metres: 1400s to 1600s

Operators will keep a listening post and calls will be made every hour on the hour on the following frequencies:

Waikato: 2875 KHz., 14225 KHz., 21330 KHz.
Waikupo: 2850 KHz., 14250 KHz., 21330 KHz.

OBITUARY

C. W. PETERS, VKCSV

We regret to announce the death of Charles William Peters, VKCSV, affectionately known as "Buffalo Bill". Bill passed away on 10th November, 1970, following a long illness.

First on the air in early thirties, Bill went through all the stages of early radio and had great fun with slot jar rectifiers and graduated through 240s, 210s, right through to the Swan 350.

Bill was a kindly, unassuming, endeared himself to all and he was at all times ready and eager to assist the younger members. Bill, unfortunately, had to retire before retiring age and it was then that Amateur Radio came to his aid. He will long be remembered as a base station for the mobiles. He would call them in turn and see them all into their stables, as he used to say.

We extend our sincere sympathies to his KXV Eva, his son Bill and relatives.

CENTRAL COAST AWARD

Commencing from 1st December, 1970, a new award, to be known as the Central Coast Award, will be available to Radio Amateurs throughout Australia and the world.

The award is best sponsored by the Central Coast Tourist Authority through the Central Coast Branch. Details are as follows:

1. Operators of overseas stations may qualify by making radio contact with any two stations in the Central Coast area and by submitting a log, together with two IRCs for return postage by surface mail.

2. VK operators (excluding Central Coast operators) can gain an award by contacting four stations in the Central Coast area plus the club station VK3AFY and submitting a log, together with 10 cents in stamps.

3. Central Coast operators can also gain an award by contacting ten stations in the Central Coast area plus the club station VK3AFY and submitting a log, together with 10 cents in stamps.

4. This award is made available as a h.f. or v.h.f. award. Operators must qualify on either h.f. or v.h.f. bands.

A. Logs to be sent to: Awards Manager, Central Coast Branch W.I.A., P.O. Box 336, Gosford, N.S.W., 2250.



TELECOMMUNICATIONS AND ELECTRONICS (TE/-)

The second meeting of this Industry Standards Committee was held in October following a meeting of the executive of the committee. The chairman, Mr. P. R. Brett (P.M.G. Department), reported that all the technical committees recommended at the first meeting had been constituted and that the seven active technical committees had aggregated a total of 46 meetings. Several subcommittees had been formed covering such subjects as micro-circuits, radio reception, radio transmission and serials, while a special panel had been formed to deal with polyethylene insulation of telecommunication cables. The committee organisation had been productive, with six new standards reaching the stage of publication, seven drafts being circulated for public review,

SUBSCRIPTIONS DUE

All members of the W.I.A. are reminded that annual subscriptions are now due and should be paid promptly to their Divisional Secretary. Non financial members will not receive a copy of "A.R.", and back copies may not be available upon request. To preserve continuity of your files of "A.R.", please pay your annual subscription now.

and many other documents currently under consideration.

Other matters discussed were the metrication programme, the future work, and the formation of new technical committees covering capacitors, resistors and printed circuits.

The Executive of the Telecommunications and Electronics Industry Standards Committee has met to discuss what may be required in their sector by way of metric standards. Their general comment was that the major problems would be associated with the supply of materials and components and with other mechanical engineering aspects of the industry rather than with electrical requirements, which are already effectively in terms of SI units.

The executive went on to analyze the types of problem that would be faced by the telecommunications and electronics industry, and noted that there would be a number of matters for the Metric Conversion Board and its Advisory Committee, e.g. in relation to economic availability of basic materials in rationalised metric sizes, the time programme for conversion, education and training, and some aspects of instrumentation and test equipment. It was considered that there would be some matters for reference to the S.A.A. Metric Standards Advisory Committee, such as conversion data and processes, and rationalisation and preferred numbers.

Finally, the executive recognised that the technical committees under their supervision would need to consider both existing and future standards, to decide what was required by way of conversion of such standards into fully metric terms.

—S.A.A. Monthly Information Sheet.



PROVISIONAL SUNSPOT NUMBERS

Dependent on observations at Zurich Observatory and its stations in Locarno and Arosa.

OCTOBER 1970			
Day	R	Day	R
1	—	22	14
2	—	23	—
3	—	24	78
4	—	25	—
5	—	26	—
6	—	27	—
7	—	28	—
8	—	29	—
9	—	30	—
10	—	31	—
11	—	32	—
12	—	33	—
13	—	34	—
14	—	35	—
15	—	36	—
16	—	37	—
17	—	38	—
18	—	39	—
19	—	40	—
20	—	41	—
21	—	42	—

Mean equals 55.5.

Smoothed Mean for April 1970: 106.5.

Predictions of the Smoothed

Monthly Sunspot Numbers

November 83 February 86

December 80 March 84

January 82 April 82

—Swiss Federal Observatory, Zurich

Dow Key Relays to Clear

● We offer three Models DK72 high powered relay-position 1/2 wattage commonly used for switching antennas, etc. up to 500 MHz. Mounted in waterproof sealed cans for rust proof mounting. Coil voltage: One 150 V.D.C. Price \$2.15. A.C. and one at 24V D.C. Price \$11.90 each.

● One only Model DK2636 52 ohm 12V. O.C. relay 1/2 wattage commonly used for switching linears in and out. Price \$11.90 each.

● One only Model DK77 Miniature Coaxial Relay (BNC connectors), 28V D.C., rated at 50 watts. Price \$2.15.

● Bulgin Rotary (Yale) type Switches: S400 MBS 3-pole 1-position 25 Cents each.

● S246 MBS 1-pole 2-position, 25 Cents each.

● Geloso Variable Capacitors designed for use with Pi Couplers in Geloso Q222 Transmitters. Matched Pair \$3.20.

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Overseas Magazine Review

Compiled by Syd Clark, VK3ASG

"BREAK-IN"

September 1970—More Circuits and Diodes, ZLAIQ. For the solid states.

T.V. Line Output Tubes as R.F. Amplifiers, ZLAIQ. "For those in peril." Tuned bands these tubes have a life measured in minutes. Once the techniques are mastered there is no reason why they should not achieve 1,000 hours.

Burglar Alarms, Some Thoughts and Ideas, ZLAIHS. How to build and fit a device which will let the insiders know the outsiders are in.

October 1970—

Diode Signal Isolators, ZLAIQ. Solid state switches.

Circuit for All VK3GK. Describes a simple method of drafting.

Use the Pels, ZLAIHS describes a tilt-over meter.

U.W.R. and All That, ZLAIAT. Theory for those in need.

S.S.B. Exother 2 MHz. Phasing Type, ZLAI.V. Some addenda.

"CQ"

October 1970—

A Solid State Permeability Tamed V.F.O. with Digital Readout, PVPSC. Two 38T13 transistors, a few other components and you are away.

"CQ" reviews the Collins ML-1 Linear Amplifier. Four 61A triodes and some extra tubes enable Collins to run 1 kw. to this linear from a built-in power supply which provides filament, bias, relay and 1800v. plate supplies.

An Efficient Multiband Loop Antenna, by GWNW/VLF. Takes one quad type element, turns horizontally, fed at the midpoint of one side with co-ax, and you have a simple antenna with an effective gain over a dipole.

Evaluation of the Debat, K2BZ. It even helped me to brush up my theory.

Digital CQ and Meter Scatter Box Generators, Part 1 described the basic building blocks. Part 2 describes the circuits for four generators, two of each type, using the building blocks of the first installment.

The Resistor-Rite W8EL. This box uses five linear taper potentiometers with ranges of 100 to 1 megohm to provide any value from 0 to 1,111,111 ohms.

A Simple Audio Test Oscillator, W8TT. Three transistors in a phase shift circuit.

The Case of the Elusive V.I., W8WV. An interesting story of how a CB operator and an Amateur who were blamed for causing V.I. tracked the source down to a colour T.V. receiver Bushmanship was terrific.

"QST"

October 1970—

There is an interesting line-up of articles in "QST" for October. My vote for the "article of the month" goes to Doug de Maw, W1CER, for his article "The Ham Builder's Nightmare". Solid state components have so altered the industry that many of the "receiving components" which could be used in transmitting applications are no longer available.

The Ham Builder's Nightmare, W1CER. Component problems for designer and builder are discussed and substitutes suggested.

A Frequency Counter for the Amateur Sine-wave, W1D. Designed to suit the Collins line of gear and provide digital readout of frequency.

The Tanker Amplifier, W1UCP. 35 to 30 or 20 dB gain depending upon whether you used 811As, 813 or 803. Types which are available from disposals. 500 watts input from a 1 V. type transformer in voltage doubler power supply.

High Performance R.F. Converter, W1KILK and W1WFG. 180 to 1 with an 80 metre tuner. PFT v. amp and VET mixer. Five bands.

Frequency Multiplication Techniques for VLF and UHF S.B.B., DJAZC. Signal processing to eliminate distortion produced by conventional multiplication methods.

A Scope Adapter for Transmitter Monitoring, W1KILK. Adds to the usefulness of your c.r.o. Schematic, W1KILK. VLF-amplifier and V.S. Meter for V.H.F., WA0UZO. 1, 10 and 100w.

fs.d forward and reverse. Inexpensive and accurate.

An External V.F.O. for the SB100 Transceiver, W2KZV. As I remember the spec for this SBE line, it did not cover the bands of interest in VK. Now it will.

Under the heading of Recent Equipment, the Heath GR-76 and Knight R-186 receivers are reviewed.

Amplitude Oscar, K2QHW. Ionospheric propagation results.

For the DXer the 37th A.R.R.L. November Sweepstakes and 36th A.R.R.L. International DX Contests are discussed.

"RADIO COMMUNICATION"

September 1970—

A New Approach to V.H.F./U.H.F. Receiver Design, G3NNG. Part 2 continues with i.f. amplifier, board layout, etc.

A V.H.F. Dip Oscillator, G3SHW. Covering a frequency range of 29-460 MHz, this instrument uses a pair of TIS8/2N2435 FETs. Technical Topics, G3VA. Synchrodyne Receivers, vertically polarised aerials, all-band vertical, directional verticals. Butler v.x.o. and other oscillator topics. Cathode coupled FET oscillators using MPF108.

Simplified Stripline Filter for 144 MHz. P. T. Bellamy. About 3 MHz wide and centred on 145 MHz. Ideal for v.h.f.s.

"RADIO ZS"

August 1970—

30 Metre Transceiver, ZS3AJM. Small s.b.t. transceiver using valves and based on a "QST" article.

Helical Whip Antenna Plan, ZS3JP. "The Rhodesian Mobile Antenna" is described as a wonderful gadget that can be tuned to any band, 10 to 40 metres, using a normal pi network. Winding details are given.

Some Linear Considerations, ZS3HF, Part 3. Power supplies.

Things Haven't Changed Much Over the Years, ZS1CD. The story of the Golden City Radio Club.

Islander Welch, H3ABD. Reprinted from "Ohm".

September 1970—

VET Front End and Pre-Mixer with Electronic Bandwidth Switching, ZAKSE5. Candeo MPF108s.

Some Linear Considerations, Part 3, ZS3HF. A form of cathode coupled circuit which does not use filament choke and power measurements are discussed.

The H.F. Discose, ZS3HF. The discose is a vertically polarised, broad-band antenna with low v.h.f.w. over a frequency range of about 18/1.

Professor Nutsenhamm and the Speed Key, ZS6-33. A fantasy.

R.C.A. "HAM TIPS"

August 1970—

2 and 10 Metre Band Transceiver, K2BBX. Looks reasonably simple and uses those old fashioned heat generating electronic devices known as tubes.

"SHORT WAVE MAGAZINE"

September 1970—

The Milliwatt Six, G3WLT. Describes an all transistor ix for top band GRP operation. Base Two Metre Transmitter, G3BDR. Four stages in three valves for medium power input. Final QVQV/20A.

Wave Clap, G3QJQ. Design, G3GJQ presents another mathematical approach.

Linear R.F. Ammeter, G8HL. Described as a useful practical design which will enter for aerial feeder currents varying from about 20 mA. to 3 amp.

"Q3"

September 1970—

Integrated Circuit C.W. I.D. Generator, by WTPUC. Automatic identification for your station.

Six Valves from Twelve Valves, K2QSY. Six bucks for a twelve valve drop-out.

The Inducting Oscillator, K3HAF. Another dipper circuit, 1-600 MHz.

Tuning V.H.F. Receivers, K1CLL. Clever in-built compensator and oscillator unit.

Cable Practice 1 in a Baby Talk, W0PXA. Everybody's doing it.

Using These Outgain ICs, WA2KLK. Three testbenches will test most of the ICs you are likely to encounter.

Repeater Antenna Separation, K6NVH. One of the standard ways to improve repeater range.

Diode Stacks, W2BEG. Replacing those high power rectifier tubes.

Repeater Receiver Gain Control, V0JRN. Using one transistor and a zener.

A New Approach to Communications Equipment, K3ALD. A call for manufacturing standardisation.

Lead Relays for Co-axial Switching, W1CER. Work very well for u.h.f. low power applications.

Low Cost Resistance Decade, W8ATN. First in a series of file box test gear.

The DY-Comm. V.H.F. P.M. R.F. Amplifier, Staff. Transistorised, 15 watts out.

Lead Relays for Co-axial Switching, W1CER. The horrible truth about C.B.

Beer Can Two Metre Co-axial Antenna, by WA0WJ/S. Drink your way to a good signal.

Converting 24 Volt Relays to 115V. A.G. Douglas. Using a couple of cheap diodes.

Versatile MOSFET Converter, W8WV/T. Low noise, high gain, ultra stable.

October 1970—

This month the secret is on IC Projects and the W8NSD dubitate is that the ARRL will not let him run a "Q3" show at their National Convention.

Understanding and Using ICs, W8NSD explains the theory behind it all.

Using the American Use KICLs. Discusses the various types on the market and what they can do for you.

Regulator Circuits for Ham, W2BEG. Makes a simple regulated supply.

Candlebug. K3AZG describes one way of convincing your XYL that your new place of gear "didn't cost much". My personal feeling is that the price he paid was too high.

The Phase Locked Loop Comes of Age, K2JKX. Synchronous detection and how the IC makes it practical.

Lead Relays for Co-axial Switching, W1CER. The Phase Locked Loop Comes for the Experimentalist, WA1KLK. 0.01 Hz. to 4 KHz.

Tuning Repeater, K6NVH. How, why and the gadget to do it.

IC Power Source, W1RAN. Simple regulator. Solid State Tuner, W8MYL. Ten minutes.

Four-Wire Inverted Vee, W8ACOB. Better internal average.

IC Marker Generator, K6BEC. 200, 100, 50 and 25 KHz.

Improving Regulation, K6WB. In solid state high voltage supplies.

General Class Steady Gals, Staff. Part 3. Power.

Working in Romania, Y0SBO. Peeking behind the Iron curtain (very puny).

☆

Book Review

"AMATEUR RADIO TECHNIQUES"

By Pat Hawker, G3VA. Third edition, published by the Radio Society of Great Britain, London, England. 208 pages, 94 in. x 74 in.

This third edition of "Amateur Radio Techniques" is a somewhat enlarged version of the second edition published two years ago. Approximately 38 per cent of the contents are new material. In this book Pat Hawker, G3VA, has successfully combined the best of all items presented by him as a monthly feature in the R.S.G.B. journal.

"Amateur Radio Techniques" is written in a straight forward and easily understood manner and is copiously illustrated with circuit diagrams. These alone provide a wonderful source of inspiration for any Amateur.

The following is a list of chapter headings: Semiconductors, Components and Construction, Receiver Topics, Oscillator Topics, Transmitter Topics, Audio and Modulation, Power Supplies, Aerial Topics, and Fault-Finding and Test Units.

An appendix lists the IP's of most commercially built receivers, both disposals and present day.

The publication is not meant to be a textbook, nor does it supplant the recognised Amateur Handbook. However, the material contained in its pages, particularly in relation to semiconductors, will be of great value as a reference source when you are commencing to dabble with solid state devices.

"Amateur Radio Techniques" is a must for all Amateurs, whether you are strictly concerned with your approach or an inveterate home-brew man.

If you already have a copy of the second edition you will probably want this edition as well for the new information it contains. If you do not have a copy at all, then this book is a must.

The review copy came direct from R.S.G.B. and copies should be available shortly through the various booksellers. British price is twenty shillings sterling.

Amateur Radio, January, 1977

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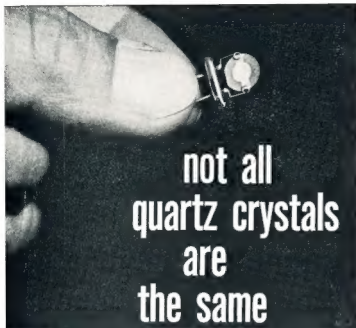
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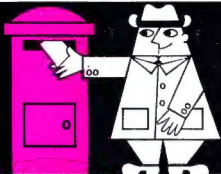
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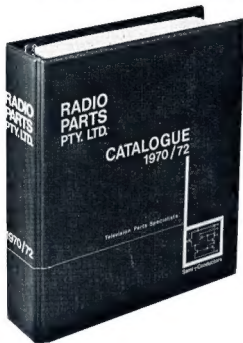
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